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The Effect of Atmospheirc Pressure on Boilers.

A PAPER was recently read before the South Wales Institute of Engineers, in which the auth r remarked that, owing to the ignorance of the men in charge of a boiler erected at a considerable elevation above the sea, only 30 lbs. of steam pressure were used instead of 60 lbs,, and hence consumption of fuel was greater than had been expected.

A correspondent of the *Colliery Guardian* thus comments upon the matter :—It appeared that the engines were erected at a considerable elevation above sea level, the atmospheric pressure being about 9 lbs. instead of 15 lbs. per square inch, and some vague idea possessed the men in charge that this diminution of atmospheric pressure might lead to the bursting of the boiler. Out of five or six gentlemen who delivered themselves on the subject in the discussion, only one appeared to have any inkling of the truth—that the atmospheric pressure had really nothing to do with the matter—and some two or three appeared to think that the precautions taken by the "Scientific Engineman" had some real justification. Allow me to state the case clearly. The pressure upon a boiler is measured, and only measured, by the weight on the safety-valve. Thus, if a boiler at the sea level is weighted to 60 lbs. per square inch, and is filled with steam, the pressure on the outside of the valve is 15 lbs. atmospheric pressure and 60 lbs. dead weight, or 75 lbs. absolute pressure, which will be the pressure inside if the steam blows off. If the boiler is gradually elevated, the atmospheric pressure on the outside of the valve will diminish, and the steam will blow off until the inside pressure equals that imposed by the dead weight on the safety-valve. The gentlemen assembled at the Westgate Hotel forgot that, if the pressure on the exterior of the boiler was diminished, it was diminished in like proportion on the outside of the safety-valve. It is so desirable that professional men should cultivate accuracy of thought that they will probably forgive this reminder.

Chilian Method of Amalgamating Silver Ore.

THE May number of *Dingler's Journal* contains an account of a process of amalgamating silver ores, practised at Copiapo, Chili, and known as Kröncke's method. It may be summarized in the following manner :

The use of a hot and concentrated solution of protochloride of copper (*kupferchlorür*) and common salt—the latter serving the purpose of keeping a larger quantity of the former salt in solution, and avoiding the formation of basic salts of copper. The use of perfectly dry and very finely ground up ore, so that the solution just alluded to may thoroughly penetrate ; wet, or moist ore, moreover, causes the formation of basic salts of copper, and thereby loss of active protochloride of that metal. Use of lead and zinc along with mercury and the protochloride of copper, in such quantities that the reactions take place according to the following formulæ :

$$3AgS+SbS_3+3Cu_2Cl+NaCl=3AgS+SbCl_3+3Cu_2S+NaCl,$$

and $$AgS+Cu_2Cl+Zn+NaCl=Ag+Cu_2S+ZnCl+NaCl.$$

Lastly, the materials (ores) to be operated upon should always, as much as possible, be of the same richness and quality throughout.

The Viaduct Railway.

PROPOSED LOCATION OF THE DOWN-TOWN DEPOT IN THE CITY HALL PARK.

AN important change in the location of the proposed down-town depot of the Viaduct Railway has been determined on by the Directors, who have concluded that the area of the Tryon-row block is insufficient for the purposes of the Company, and not altogether so convenient as might be wished. It is, therefore, now proposed to take a slice off the eastern side of the City Hall Park, running from Chambers street to the road in front of the City Hall, and going back as far as the Tax Office. This will give a space 500 feet long and 130 feet deep ; and, if needful, the depth can be increased to 200 feet after passing the Tax Office. The new arrangement will compel the removal of the engine-house at the Chambers street corner, the Park Hospital, and the Hall of Records. The entire area will be covered with a magnificent open arcade, probably terminating at the south-east corner with a handsome tower. Over the arcade will be the depot at one end, and an open plaza at the other. To carry out this plan a slight deviation in the route from Pearl street becomes necessary. As now proposed, it will not touch a single house in Chambers street or the Tryon row block. The route, on leaving Pearl street, will pass through the block bounded by City Hall place, Pearl street, Park street, and Duane street, and entirely composed of tenement houses, beer saloons, rag stores, and very small places of business ; thence across Duane street, taking the block bounded by City Hall place, Reade, Centre, and Duane streets, and occupied by CONNOR'S large type foundry and NOYES & WINES'S Corrugated Iron Works ; and then across Reade street, taking the triangular block which has its base on Reade street, and its apex at the junction of Chambers and Centre streets. A single arch, of elegant structure, will span Centre street from the north-east to the south-west corner of Chambers street, and communicate immediately with the top of the arcade on which the depot will stand.

This alteration in the plan will not at all affect the appearance or usefulness of the Park, for the greater part of the space which it is proposed to take is covered with the unsightly buildings already mentioned. The Hall of Records is a massive and ugly building, which was erected long before the Revolution as a county jail for debtors, and is consequently one of the oldest structures in the city. About fifty years ago, it was changed from a jail into department offices, and up to a few years since was occupied by the Registrar, the Controller, the Surrogate, and the Street Commissioners. The last two officials left a few years ago, and the Controller last year, as the increasing accumulation of the Registrar's Office compelled his using the entire building. Thirty-five years ago, there were under 400 volumes of conveyances ; now there are over 1,200 volumes of conveyances and 1,000 volumes of mortgages.

Inquiries were made of the President of the Viaduct Railway Company as to the rumors which have been circulating for a few days past about other quick transit lines. Judge HILTON laughed at the idea of buying them up, and declared that such an idea had never been contemplated by the Directors, and should never be carried out so long as he remained President of the Company. "We have no money for any such purpose," he said ; "our money has been raised to build a railroad with, and we mean to build a railroad with it, and nothing else."

Smelting Processes at Freiberg.*

By PERSIFOR FRAZER, Jr.

THE Freiberg smelting processes have for their object the production of silver, lead, and copper (chiefly as blue vitriol), from the ores obtained from the royal Saxon mines ; but, outside of these, from other purchased materials and foreign ores (as for example, jewelers' sweepings and American ores), and middle products from previous smelting processes (silver, lead, etc.), but especially copper and gold from the foreign ores. The sulphur which is present in the ores in great quantity is applied as much as possible to the manufacture of sulphuric acid, as also the greater part of the arsenic present in the ores is converted into various products of the arts. White arsenic (arsenious acid), red arsenic (realgar of commerce), yellow arsenic (orpiment of commerce), and black metallic arsenic (so called cobaltum or fly stone). They have also turned their attention recently, with good result, to the experimental production of zinc from the ores rich in that metal. The percentage of silver in the Freiberg ores comes especially from more or less finely-divided silver glance, polybasite, stephanite, ruby silver ores, and silver Fahlerz. Silver occurs also occasionally though seldom, native, as a wiry, hair-like mass called washed silver, and in combination with arsenic, tellurium and antimony. Lead occurs only as galena in these ores ; copper as copper pyrites, peacock ore, and copper ; Fahlerz and the other ores only as combinations with sulphur, never oxidized. The constituents of these ores of secondary importance, which constitute the gangue, are iron pyrites, arsenical pyrites, zinc blende, and earthy substances, such as quartz, lime, fluor spar, heavy spar, and brown spar. A great part of the Freiberg ores contain traces of gold, cobalt, and nickel, but not in paying quantity.

METALLURGICAL DIVISION OF THE ORES.

All the ores are divided into—I. LEAD ORES.—Ores (without exception argentiferous) which make about one-third (⅓) of the entire production of the mines. These are divided again according to their percentage of lead, or the amount of their valueless constituents, into—a) Plumbiferous ores, and b) Glances (or galenoids). While the percentage of lead in the former varies between fifteen and twenty-nine per cent., and the percentage of the valueless constituents, such as iron pyrites, arsenical pyrites, zinc blende, and quartz, exceed it ; in the latter it goes from thirty per cent. to the highest percentage of lead possible, and the gangue is only represented in small quantity. Pure galena (PbS) contains stoechiometrically 86.61 per cent. lead ; but it never occurs in nature with so high a percentage of lead. The average percentage amounts to about 40 per cent. lead and 0.15 per cent. Ag.

* Read before the American Philosophical Society, June, 17, 1870.

II. DÜRR ORES.—These are the real silver ores which contain no lead and copper (at least in paying quantity), and frequently consist entirely of earthy gangue. As these so often contain arsenical pyrites, iron pyrites, and zinc blende, they are divided according as one or the other of these predominates. *Dürr Ores.*—1st, silicious; 2d, spathic; 3d, pyritic; 4th, blendic. The silver in these varies from two-hundredths of a per cent. (0.02 p. c.) to several per cent.; so that among them occur the richest ores that are brought to the furnace.

III. COPPER ORES.—These are also always argentiferous, but occur *comparatively rarely*. Their percentage of copper varies between 1 per cent. and 10 per cent.; is in the average, however, about 3 per cent. Their constituents of secondary importance are mainly pyritic and blendic. Copper ores with a high percentage of copper are scarcely ever produced by the Royal Mining Works; but often very rich ores are obtained from foreign countries—chiefly America. The above three classes of ores are united under the general head of "paid ores," because their purchase is regulated by the established price which the smelting works pay for each metal. The sulphur and arsenic in these ores are paid for when the material is furnished in lumps, and not pulverized. In such ores the sulphur is paid for when it exceeds 20 per cent., and the arsenic when it exceeds 25 per cent. In contradistinction to the "paid ores" are:

4. THE "REAGENT ORES."—The purchase of such ores takes place only conditionally on the need which may be felt for them in the different smelting processes, and on the basis of any agreement made between the smelting works and the particular mines furnishing them. All those ores belong to this class, whose percentage of silver varies from one to one and a half hundredths of one per cent. (0.01-0, 0.015 p. c.), provided that a percentage of 15 or more per cent. of lead, or 1 or more per cent. of copper, does not place them among the copper or lead ores. In these ores also the sulphur and arsenic are paid for under the same conditions as in the "paid ores," except that in arsenious ores the broken form is not desirable. The constituents of these ores are principally iron pyrites, arsenical pyrites, zinc blende, quartz, calcite, etc.; at the same time they always contain small quantities of copper and lead. According to these constituents, these are called pyrito-blendic, silico-pyritic, and silico-blendo-pyritic. To the classes of the reagent ores come those Dürr ores, which contain but little silver (up to 0.04 per cent. when 15 per cent. and upwards is present). The furnishing of the ores is performed with them either *dry* (1st) dry stamped, (2d) in lumps, as is the case with the reagent ores, or in a moist condition (jigged or washed ore). In the stamped ores, besides a careful mixing, such a size of grain is required, that when it is sifted in a sieve of 675 meshes to the square inch not more than 15 per cent. remains behind. In wet ores it is required that they be as free as possible from hygroscopic water; that they can be weighed with certainty, and permit the obtaining of a reliable average analysis; and that they be neither in a viscous nor liquid condition.

I. THE LEAD PROCESS IN CUPOLA FURNACES.

The object of this process is, after previous roasting of the argentiferous Dürr ores, Galenoids, and plumbiferous ores with the proper reagents in a roasting furnace, so to smelt them in a cupola furnace that the silver is extracted by the lead (raw lead), and further that there is produced a combination of different sulphides of the metals (lead matt), and when the ores contain nickel and cobalt, also a combination of arsenides of the metals (lead speiss); on the other hand, the earthy constituents and less easily reducible metal oxides combine to form a slag (lead slag).

COMPOSITION OF A CHARGE.

The ores which come to the lead process are:
1. All the lead ores (Galenoids and plumbiferous).
2. All the Dürr ores from 0.1 per cent. Ag. upwards.
3. Copper ores from 0.1 to 0.15 per cent. Ag. upwards, when the percentage of copper does not exceed 6 per cent., because otherwise the raw lead produced would be rendered too impure by the copper, which has a powerful affinity for lead. The above ores are then sorted and mixed. By sorting is understood a mixing together of those ores which contain, and are treated for the purpose of extracting, one and the same metal, but whose various percentages of this metal are different, and which behave differently in the furnace. For example, in Freiberg all lead ores are *associated together* and mixed with the Dürr ores, which in their turn are associated together among themselves, as they possess different percentage of silver and different earthy constituents, and also behave differently when smelted. By mixing is understood a mixing of the ores which are to be treated, with the reagents, such as calcite, heavy spar, old slag, or some already existing middle produce of the smelting works.

OBJECT OF THE COMPOSITION OF THE ORES.

The objects of the sorting and mixing, or composition of the ores are: 1st. In order to obtain a quantity of the metal or product (raw lead, raw matt), which experience proves to be most advantageous, and, what often depends upon this, to procure in the product (*i. e.* raw lead) a certain definite percentage of silver. 2d. In order to obtain a good run, in which the earthy constituents of the ore unite in a fusible slag, which would not be the case if each kind of ore was smelted by itself. The weight of one of these mixtures, which are kept ready in the mixing house, is from 2000 to 3000 centners, of which 80 per cent. are lead ores and 20 per cent. Dürr ores (including copper ores, if such are present). The amount of lead in such a mixture varies between 30 and 40 per cent. of lead; that of silver, 0.15 to 0.18 per cent.

Very rich Dürr ores are excluded from this composition. They are strewed on the floor of the charge room amongst the other ores, as these latter are used up, and from time to time again sorted and mixed, in order to avoid as much as possible mechanical loss. The separate charges are transferred in wheelbarrows from the ore house to the charge house, and dumped in alternate thin layers of lead ore, copper ore, and Dürr ore on the floor. From a heap thus made the mixer takes vertical slices with a shovel, and throws them together in the form of a cone in some other place. To make the mixing still more complete, this operation can be repeated. This mixed mass is pushed from here in iron cars (railroad cars) over the roasting furnace, and dumped there. The dry stamped ores are moistened before this mixing, in order to prevent the raising of too much dust.

II. ROASTING OR PREPARATORY WORK WITH THE ORES AND SOME ALREADY FORMED PRODUCTS.

The object of roasting is an oxidation of the metals which are combined with sulphur and arsenic, and a volatilization of the above inflammable bodies up to a certain point. A complete volatilization of these materials is not intended. The roasting of the lead process charge can be undertaken either, 1st. In double roast furnaces, or in combined hearth and muffle furnaces. 2d. Of late years principally in "forward-shoveling" roast furnaces. The real roasting space of the double roasting furnaces, or hearth and muffle furnaces, consists of the hearth and the muffle. The hearth is along side the fire-place, which latter consists of grate and ash box, and the fire-place is seperated from the hearth by a bridge made of bricks. The muffle lies over the hearth, and is entirely separated from it, but is heated by the flame which passes both below and above it. The under hearth is ten feet long and five feet six inches broad (Saxon measure). The roof of the hearth consists of three strong slabs of slate, which rest on three arches, which in turn abut against the longer sides of the furnaces. These slabs form at the same time the floor of the upper hearth or muffle, which, with the exception of three working doors, some air holes, and an opening for the roast gases, is closed on all sides, like a real muffle. The sole of such a muffle is thirteen feet long and six feet broad. The products of combustion of the stone coal, mingled with the gases arising from roasting these ores, escape from the lower hearth, and pass through a chamber above the muffle, which thus acts as a dust-condensation chamber. At the extremity of the furnace it enters a canal, which connects with a subterranean passage leading to a chimney 150 feet high. The gases from the muffle, on the contrary, escape separately through a long canal to a set of terrace-built condensing chambers, which they traverse, uniting with the other gases behind these chambers, when all go together to the 150 feet chimney. In these long Canals and Dust condensation chambers (which latter are erected above ground, and provided with a roof of iron plates for the better cooling off of the vapors, but in other respects built of brick), the roast Gases find ample opportunity to deposit all condensable ingredients, especially arsenious-acid ($As_2 O_3$), and the mechanically suspended little particles of ore dust, which otherwise would pass through the chimney and reach the open air, injuring the neighboring vegetation. In the Muldner Smelting works there are 6 such furnaces in a row, which are to be altered, as 18 already have been, into "Forward-Shoveling" Roast furnaces.

[To be continued.]

The Physical Constitution of the Sun.

By Professor W. A. NORTON.

[CONCLUSION.]

IN view of the concurrent testimony that we have now seen is afforded by the two departments of Cometary and Terrestial Physics, it will be admitted that in attempting to gain a new insight into the physical constitution of the sun and the processes of change in operation on its surface, we are at least entitled to assume the following as probable hypotheses.

1. That the sun exercises a repulsive action upon molecules of every gas or vapor that subsists at its surface, or is at any time in any part of the region of space exterior to the surface; that this force is the sum of all the heat impulses propagated in ethereal waves from all the gaseous molecules posited above the solid or liquid body of the sun, and from the surface molecules of this central mass, except in so far as these impulses may be intercepted in their passage; and that it is opposed to the force of gravitation, which is due to a virtual attraction of the sun's entire mass—so that the effective force soliciting any gaseous molecule is the difference between these two forces, attractive and repulsive, by which it is urged.

2. That the force of solar repulsion, since it consists of impulses propagated in ethereal waves, is comparatively more effective in proportion as the atomic weight of the solar vapor is less; it being assumed that the quantity of matter in any atom is proportional to its volume.

3. That in a hypothetical condition of equilibrium of the sun's atmosphere the elastic force of each of its vaporous constitutents, at any depth, will consist in the intensity of the effective heat impulses tending to urge its molecules outward; which will be counteracted by the weight of the superincumbent portion of the atmosphere. Now, let us assume, for the moment, that at some anterior epoch in the sun's history, all the present vaporous constituents of the sun's atmosphere were diffused throughout a space exterior to the central body of the sun and limited by the spherical surface (A), at which the molecules of the vapor of greatest atomic weight are in equilibrium, under the action of their own weight and of the heat-repulsion urging them upward. This hypothetical state of things could not continue, since the atoms of each of the other solar vapors would be urged upward by an effective force. If we conceive a small quantity of each of them to escape from all points of this surface, the rising vapors will ascend to greater heights in proportion as their atomic

weights are less, and finally, when the equilibrium is attained, form a series of spherical envelopes, wholly detached from each other, and arranged in the order of atomic weights;—beginning with the heavier metallic vapors, and terminating with the lighter (potassium, sodium, etc.,) and the permanent gases, with hydrogen outermost. If other small portions of each of the vapors were to rise from the surface, A, they would serve to augment the thickness of the envelopes already formed; and the same would be true for each successive discharge. The final result would be the same if the discharge were continuous during a certain interval of time, as would naturally happen. After a certain amount of the solar vapors have escaped, contiguous envelopes might interpenetrate each other more or less. What it is especially important to observe, is, that *throughout the whole depth intercepted between each envelope, and the outer limiting surface*, A, *of the vapor of greatest atomic weight, every atom of the substance of which the envelope is composed, that may chance to be present, is urged upward by a force of repulsion.* If, as we must suppose, the rise of the solar vapors from the surface, A, continues for an indefinite time, the interpenetration of contiguous envelopes would increase, and eventually a condition of equilibrium would be attained, if the sun's temperature remained the same. But if this temperature were to increase, as it must down to a certain epoch in the process of consolidation, the process above indicated would be continually renewed. It is still more important to observe, that if there were any cause in operation withdrawing continually at short intervals a portion of one or more of these rising vapors, a statical equilibrium would not be reached; and it would be permanently true that *for every such vapor there would be a region of repulsion*, as above stated, *extending from its envelope down to the outer limit*, A, *of the vapor of greatest atomic weight.* Throughout this region the vapor would be perpetually rising, taking the place of that which is withdrawn, and so maintaining a *dynamical equilibrium.* The depth of this region would be the greatest for hydrogen, the outermost gas (unless there is some solar vapor of less atomic weight than hydrogen). Now it is easy to see that a certain physical cause tending to produce such results, must come into operation at some stage of the sun's process of consolidation. As conceived by FAYE, the cooling going on at the outer surface must eventually bring the temperature there down to the point at which the vapors having the highest affinity for oxygen will undergo combustion. The products of such combustion, being compound molecules, will have a greater weight in comparison with the repulsion to which they are exposed, than the simple molecules before the combination took place, and hence they will descend, more or less rapidly, into the depths of the photosphere. To all appearance the sun is now passing through this period of its physical history, as supposed by FAYE; and in the "granulations" which give to the solar disc a mottled appearance (HERSCHEL'S "subsiding chemical precipitates,") we probably discern the products of the combustion occurring in the upper photosphere and determining its outer limit, in the act of descending. The continual upward flow from the depths of the photosphere, of the hydrogen, oxygen, and the lighter metallic vapors, will bring about the necessary intermixture of oxygen with the other vapors. This must occur below the natural outer limit of the hydrogen envelope; and we know that as a matter of fact, the chromosphere, composed chiefly of hydrogen, extends above the photosphere.

If the products of the surface combustion were all to descend indefinitely into the vaporous photosphere, without undergoing decomposition, no farther visible effects would ensue. We could only follow with the mind's eye the gradual growth of the central nucleus of the sun, and recognize that we probably have before us a picture of the process by which the materials of the earth's crust were fashioned and accumulated in the earlier ages of its history. But the probability is that the descending masses would eventually arrive at a depth where the higher temperature would effect a dissociation of the combined elements (as FAYE supposes). This must inevitably happen unless the tendency of the heat, that augments with the depth, is counteracted by the opposing tendency of the increasing gaseous pressure. By reason of these opposing tendencies, it may well happen that there may be a certain region of dissociation of limited depth, above and below which decomposition would not occur. But it is to be observed that it does not follow that all of the products of surface combustion, as they pass through such a region, would be decomposed, since the reduction of temperature attending every instance of decomposition tends to prevent decomposition of other surrounding masses in the act of descending.

This sudden dissociation of large masses of combined elements, though occurring at certain depths within the photosphere, it will be seen may eventually play a conspicuous part at the surface. Unless the region of dissociation should lie below that of repulsion for the elements separated, these elements after separation will be urged upward by the effective force of repulsion, ascend rapidly, and emerge with a high velocity above their respective envelopes. The ascensional velocities attained will be greater if large masses are suddenly decomposed. The masses of hydrogen set free should attain to the greatest velocity, and rise to the greatest height. They should rise, in eruptive masses, above the hydrogen envelope, or, in other words, the chromosphere. According to LOCKYER, in the solar protuberances, the ascending hydrogen has, in some cases, a velocity as high as 120 miles per second, and rises to a height of more than 40,000 miles.

A vertical jet of hydrogen, having a projectile velocity of 120 miles per second, should attain an altitude of 43,000 miles, if the solar gravity were constant for that altitude. Some prominences have extended to a height of 100,000 miles above the sun's photosphere. Prof. RESPIGHI has even noticed instances of an elevation of 160,000 miles. Such enormous heights imply either a greater initial velocity than 120 miles per second, or that the full energy of the solar attraction does not take effect on the eruptive masses of hydrogen, in the region above the photosphere. From our theoretical point of view, we perceive that the latter supposition should be true, since the solar repulsion should be in operation above the hydrogen envelope, or the chromosphere, diminishing the gravitating tendency.

The metallic vapors set free in the region of dissociation, should rise to heights varying with their atomic weights. Some of them, especially the lighter ones (sodium, magnesium, calcium, etc.), may acquire velocities sufficient to bring them above the chromosphere. In fact, the spectroscope has detected, besides hydrogen, magnesium, sodium, iron, and chromium, in the solar protuberances. LOCKYER states that he has invariably found that in solar storms the chromospheric layers are thrown up in the order of vapor density. He regards the chromosphere as built up of the following layers, which are in the order of vapor density in the case of known elements: a new element, giving the green coronal line in the spectroscope, hydrogen; another new element, magnesium, sodium, barium, iron. He remarks that "all the heavier vapors are at or below the level of the photosphere itself."*

The green coronal line was traced in the late eclipse by Professors YOUNG and WINLOCK as far as 16′, or 425,000 miles from the sun's limb. From our present theoretical stand-point, we naturally infer, as LOCKYER has already done from his observations, that the element present in the solar corona which gives this line is much lighter than hydrogen. We see also that an element several times lighter than hydrogen might be subject to a solar repulsion that would predominate over the attraction of gravitation at all distances, and urge the subtil vapor indefinitely away from the sun. Since the same line is seen in the light of terrestrial auroras, we must conclude that the same substance is present in our upper atmosphere—either in a permanent upper layer, or derived from the sun (as I have elsewhere maintained). We must infer also that it is magnetic, which apparently cannot be the case unless it takes on the condition of compound molecules. Such compound molecules might become dispersed in the upper atmosphere of the earth, or in the photosphere of the sun, by electric discharges or sudden evolutions of heat; and then the separate atoms repelled off, forming the streamers of the corona and aurora, illuminated either by electric light, or, in the case of the corona, in part also by reflected solar light.*

The probable origin of the sun's spots, and other questions of solar physics that claim attention, must be left for future consideration. I will only remark here, that it has long been apparent that the diverse phenomena which occur at the sun's surface are traceable, more or less directly, to the action of some form of eruptive force. *The present investigation seems to have led to the discovery of the true nature and origin of this force; and at the same time to have revealed the process by which the sun's radiation is maintained.* The primary source of the solar heat being, doubtless, as now generally believed, the process of condensation maintained by the force of gravitation.

It is worthy of remark, in conclusion, that as comets directed our attention, at the outset, toward the sun, so the sun, in its turn, leads us back again to our starting point; since we see that if we transfer to cometary bodies the physical structure we have recognized in the sun's upper photosphere, viz.: the existence of a succession of light vaporous envelopes, subject to the energetic action of the force of heat repulsion, the mystery in which some of the curious transformations they undergo, have hitherto been involved, seems to be in a great degree dispelled. No one doubts that comets are chiefly composed of very light vapors; though some of the larger ones may have a solid nucleus. If, as intimated, certain observed cometary phenomena indicate that these vapors, like the solar vapors, are arranged, for a certain depth at least, in envelopes, which are liable to be greatly expanded, or even wholly expelled by the increased amount of heat received from the sun, we have in the probable physical structure of comets, another indication that these bodies were originally detached from the sun's photosphere, in addition to that furnished by certain features of the cometary motions.†

* It is admitted by Angström and Zöllner that the absence of spectroscopic indications of oxygen and nitrogen in the sun is not sufficient evidence that these gases are really wanting in the sun's atmosphere.

* It is also conceivable that the subtil vapor streaming off in the coronal rays has been set free by dissociation like the hydrogen, from some other element of a compound substance, in the depths of the photosphere. However this may be, it can hardly be doubted that the ascent and descent of the solar vapors, and the combinations and decompositions going on among them, must be attended with disturbances of electric equilibrium, from which decided effects must result.

† Norton's Astronomy revised edition, p. 276.

The Oil-Bearing Limestone of Chicago.

By T. STERRY HUNT, LL.D., F. R. S.

[CONCLUSION.]

The objections to this view of the origin and geological relations of petroleum have been for the most part founded on incorrect notions of the geological structure of southwestern Ontario, which has afforded me peculiar facilities for studying the question. In this region it has been maintained by WINCHELL that the source of the petroleum is to be sought in the Devonian pyroschists. I, however, showed in 1866, as the result of careful studies of the various borings: first, that none of the oil-wells were sunk in the Genesee slates, but along denuded anticlinals, where these rocks have disappeared, and where, except the thin layer of Marcellus slate sometimes met with at the base of the Hamilton shales, no pyroschists are found above the Trenton limestone. Second, that the reservoirs of petroleum in the wells

sunk into the Hamilton shales are sometimes met with in this formation, and sometimes in adjacent borings, only in the underlying Corniferous. Examples of this have been cited by me in wells in Enniskillen, Bothwell, Chatham, and Thamesville, where petroleum has first been found at depths of from thirty to one hundred and twenty feet in the Corniferous limestone, in all of these places overlaid by the Hamilton shales. It was also shown that in two localities in this region, viz., at Tilsonburg and in Maidstone, where the Corniferous is covered only by quaternary clays, petroleum in considerable quantities has been obtained by sinking into the limestone.* That the supplies of petroleum in such localities are less abundant than in parts where a mass of shales and sandstones overlies the oil-bearing limestone, is explained by the fact that both the pores and the fissures in the superior strata serve to retain the oil, in a manner analogous to the quaternary gravels in some parts of this region, which are the sources of the so-called surface oil-wells. It is, therefore, not surprising that examples of pyroschists impregnated with oil should sometimes occur, but the evidence of the existence of indigenous petroleum, which is so clear in the various limestones, is wanting in the case of the pyroschists; although concretions holding petroleum have been observed in the Marcellus and the Genesee slates of New York. There is, however, reason to believe, as I have elsewhere pointed out, that much of the Petroleum of Pennsylvania, Ohio, and the adjacent regions, is indigenous to certain sandstone strata in the Devonian and Carboniferous rocks.†

At the meeting of the American Association for the Advancement of Science at Chicago, in August, 1868, in a discussion which followed the reading of a paper by myself on the geology of Ontario,‡ it was contended that, although the various limestones which have been mentioned are truly oleiferous, the quantity of petroleum which they contain is too inconsiderable to account for the great supplies furnished by oil-producing districts, like that of Ontario, for example. This opinion being contrary to that which I had always entertained, I resolved to submit to examination the well-known oil-bearing limestone of Chicago.

This limestone, the quarries of which are in the immediate vicinity of the city, is so filled with petroleum that blocks of it which have been used in buildings are discolored by the exudations, which, mingled with dust, form a tarry coating upon the exposed surfaces. The thickness of the oil-bearing beds, which are massive and horizontal, is, according to Prof. WORTHEN, from thirty-five to forty feet, and they occupy a position about midway in the Niagara formation, which has in this region a thickness of from 200 to 250 feet. As exposed in the quarry, the whole rock seems pretty uniformly saturated with petroleum, which exudes from the natural joints and the fractured surfaces, and covers small pools of water in the depressions of the quarry. I selected numerous specimens of the rocks from different points and at various levels, with a view of getting an average sample, although it was evident that they had already lost a portion of their original content of petroleum. After lying for more than a year in my laboratory, they were submitted to chemical examination. The rock, though porous and discolored by petroleum, is, when freed from this substance, a nearly white, granular, crystalline, and very pure dolomite, yielding 54·6 p. c. of carbonate of lime.

Two separate portions, each made up of fragments obtained by breaking up some pounds of the specimens above mentioned, and supposed to represent an average of the rock exposed in the quarry, were reduced to coarse powder in an iron mortar. Of these two portions respectively, 100 and 138 grammes were taken, and were dissolved in warm dilute hydrochloric acid. The tarry residue which remained in each case was carefully collected and treated with ether, in which it was readily soluble, with the exception of a small residue. This, in one of the samples, was found equal to 40 p. c., of which ·13 was volatilized by heat with the production of a combustible vapor having a fatty odor; the remainder was silicious. The brown ethereal solutions were evaporated, and the residuum, freed from water and dried at 100 deg. C., weighed in the two experiments equal to 1·570 and 1·505 per cent. of the rock, or a mean of 1·537. It was a viscid reddish-brown oil, which, though deprived of its more volatile portions, still retained somewhat of the odor of petroleum, which is so marked in the rock. Its specific gravity, as determined by that of a mixture of alcohol and water, in which the globules of the petroleum remained suspended, was ·935 at 16 deg. C. Estimating the density of the somewhat porous dolomite at 2·600, we have the equation ·935 : 2·600 :: 1·537 : 4.26; so that the volume of the petroleum obtained equalled 4·26 per cent. of the rock. This result is evidently too low, for two reasons. First, because the rock had already lost a part of its oil while in the quarry and subsequently, before its examination; and secondly, because the more volatile portions had been dissipated in the process of extraction just described.

In assuming 100·00 parts of the rock to hold 4.25 parts by volume of petroleum, we are thus below the truth in the following calculations: A layer of this oleiferous dolomite one mile (5280 feet) square, and one foot in thickness, will contain 1,184,832 cubic feet of petroleum, equal to 8,850,069 gallons of 231 cubic inches, and to 221,247 barrels of forty gallons each. Taking the minimum thickness of thirty-five feet, assigned by Mr. WORTHEN to the oil-bearing rock at Chicago, we shall have in each square mile of it, 7,743,745 barrels, or, in round numbers, seven and three quarter millions of barrels of petroleum. The total produce of the great Pennsylvania oil-region for the ten years from 1860 to 1870 is estimated at twenty-eight millions of barrels of petroleum, or less than would be contained in four square miles of the oil-bearing limestone band of Chicago.

It is not here the place to insist upon the geological conditions which favor the liberation of a portion of the oil from such rocks, and its accumulation in fissures along certain anticlinal lines in the broken and uplifted strata. These points in the geological history of petroleum were shown by me in my first publications already referred to, March and July, 1861, and independently, about the same time, by Prof. E. B. ANDREWS, in *Silliman's Journal* for July, 1861.*

The proportion of petroleum in the rock of Chicago may be exceptionally large, but the oleiferous character of great thickness of rock in other regions is well established, and it will be seen from the above calculations that a very small proportion of the oil thus distributed would, when accumulated along lines of uplift in the strata, be more than adequate to the supply of all the petroleum wells known in the regions where these oil-bearing rocks are found. With such sources existing ready formed in the earth's crust, it seems to me, to say the least, unphilosophical to search elsewhere for the origin of petroleum, and to imagine it to be derived, by some unexplained process, from rocks which are destitute of the substance.

* Silliman's Journal II., xlvi., 360; and Report Geol., Canada, 1866, pp. 241-250.
† Ibid. 240.
‡ Silliman's Journal II., xlvi., 355.

* Silliman's Journal II., xxxii., 85. See also papers on the subject by him and by Prof. EVANS, Ibib. II., xl. 33, 334; and one by the author, II., xxxv., 170; also Report Geol. Survey of Canada, 1866, pp. 256-257.

Phosphatic Sand in South Carolina.

A DEPOSIT of sand overlying the phosphatic nodular bed of Stone river has been found to contain 27 per cent. of phosphate of lime. By washing the sand can be brought up to a much higher percentage of phosphate. The layer is six feet in thickness, and after concentration and treatment with sulphuric acid, will yield a valuable fertilizer.

American Glaciers.

KNOXVILLE, Tenn., June 29, 1871.

TO THE EDITOR: Sir—Seeing in your journal a series of notices on glaciers in western North America, I am led to remind you of notices of glaciers on Mount Hood, published in Silliman's "American Journal of Science and Arts," in 1866 and 1867. (See vol. XLII, p. 423, and vol. XLIII, p. 416).

The earlier ascent of the mountain, made on July 26th, 1866, was described by Rev. H. K. HINES, in the *Vancouver Register*, (date not given,) and in the proceedings of the Royal Geographical Society of March 23d, 1867. The other, made on August 20th, 1866, was described by Prof. ALPHONSO WOOD, before the California Academy of Natural Sciences, on September 3d, 1866. Both of these gentlemen gave some details of the glaciers observed upon the mountain.

Mr. CLARENCE KING'S article in *Silliman's Journal* for March last, "on the discovery of actual glaciers on the mountains of the Pacific slope," does not actually claim the first discovery of glaciers in the United States, although a casual reading of the article might fairly lead one to infer that, and evidently has done so. We can hardly suppose that one so long interested in explorations of the Pacific Slope as Mr. KING, could have failed to be aware of Prof. WOOD'S announcement to the California Academy, or even of the notices in *Silliman's Journal*.

Yours respectfully, FRANK H. BRADLEY.

The Durability of Iron Structures.

AT a recent meeting of the English Civil and Mechanical Engineers' Institute, Mr. G. J. CROSBIE DAWSON read a paper upon the use of iron for engineering structures. The history of the subject is quite interesting. Ninety-two years ago, the first iron bridge, consisting of semicircular cast-iron ribs, was built across the Severn at Coal Brook Dale. In 1832, the first attempt was made to substitute wrought for cast-iron, by rivetting horizontal to vertical plates with angle iron, but such girders were only used in the construction of floors or as deck beams to ships. Ten years later, Sir WILLIAM FAIRBAIRN patented several improvements and designed the tubular girder In 1847, ROBERT STEPHENSON began the great Britannia tubular bridge over Menai straits, which was completed in 1850.

Mr. DAWSON considers the action of the air, moisture and carbonic acid upon iron as well worthy of notice, when we consider the time that such structures should last. Wrought-iron oxidizes, rather more rapidly than cast, but it is more uniform in structure, and its strength can be much more implicitly relied upon than cast-iron, on account of its freedom from air-bubbles, etc. We can never be sure of perfect castings; but if girders were cast upright, or on end, much better results would be obtained, than by the present system of casting them in a horizontal position. The scum and poor part of the metal would not then concentrate upon one edge of the flange and one side of the web.

Mr. DAWSON asserts that if wrought-iron beams were immersed in boiling linseed oil before leaving the manufactory, and were afterwards painted with four or five coats of good paint, they would withstand the effects of the weather for a long time. He recommended zinc paint for iron work, because of its anti-oxidation properties; he says: "By virtue of a semi-galvanic action on iron, it enters the pores and forms an amalgam of the two metals which protects the iron from decay or incrustation."

The requirement of the Board of Trade, that "in a wrought-iron bridge the greatest load which can be brought upon it, added to the weight of the superstructure, should not produce a greater strain upon any part of the material than five tons to the square inch," is considered an ample standard of strength. All plates and parts of girders should be of the same pattern, easily put together and accessible for repairs and painting. Rivet holes should be drilled; punching weakens the metal unnecessarily.

THE COAL TRADE.

B. B. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, July 14, 1871.

WHOLESALE.—There has been a lively business done during the past week, just about the amount necessary to keep a surplus from accumulating and prices steady. It is very gratifying to know that buyers have taken our advice, which will prove the best thing they could do. If trade remains in its present activity until the next Scranton Auction Sale, we predict an average advance of full 50 cents per ton, and we all know that if such is the case all the other coals will follow suit. But we do not mean to bull the market and be the means of advancing prices. We want a steady trade and regular prices, which we argued could be maintained, would buyers come forward and take the coal. We are yet under the impression that coal is very cheap, far below the price that it can be afforded for during the fall and winter, and therefore think that those who buy now will show the best judgment.

We shall have the August prices of the Pennsylvania Coal Company by next week. We are not acquainted with Mr. HOYT'S intentions, but presume that his rates will be a trifle in advance on those of July. Of course his contractors will snap at it, and well they may, for thus far this year his buyers have fared the best of any. His course of action this season is entirely agreeable to our ideas of the best interests of the trade and every way commendable.

To him is due the placing of prices at a rate that would bring buyers in the market and take the coal as it came along. The whole trade is under obligations to him for this, and we are bound to say that if trade had not been stirred up when it was, and if buyers had not come forward and taken the coal, another strike, and high and exorbitant prices would have resulted. Already we hear of grumbling in some of the regions at the low remunerative rates at which coal is selling and threats of a stoppage. How would it have been had buyers kept off and allowed a surplus to accumulate? Prices would have gone down, and the entire regions "gone out," and then the scenes of last winter would have been re-enacted.

The market has been particularly strengthened during the past week by the scarcity of Lehigh coals, and the high prices offered for them. We understand that not only has the July product been entirely disposed of, but that August supplies have also been sold ahead largely, at prices yet to be fixed. This, of course, strengthens other coals, and gives a general good tone to the market.

Prices remain at our quotation of last week. Freights also are unchanged.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending July 8, 1871, compared with week ending July 9, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	29,490	1,165,632	87,379	1,552,657
Schuylkill Canal	3,908	88,606	25,355	353,320
Lehigh Valley R. R.	36,737	1,648,069	49,386	740,381
Lehigh & Sus. R. R.	12,579	494,580	32,074	475,097
Lehigh Canal	19,244	219,833	21,871	126,504
Scranton North	12,771	348,756	13,936	114,979
" South	26,948	921,994	39,155	281,054
Penn. Coal Co., rail	20,708	574,502	23,019	174,719
" " " canal	358	7,764	847	3,370
Del. & Hud. Canal Co.	34,406	681,465	28,541	246,642
" " East	4,472	205,339	10,083	110,416
" " West	1,573	40,172	3,164	27,670
South	9,247	227,454	8,746	94,657
Shamokin	10,588	175,301	8,690	316,891
Trevorton	1,620	44,076	....	....
Lykens Valley Coal Co.	2,352	14,222	2,155	42,591
Wyoming South	....	110,562	....	....
Wyoming North	....	....	....	....
P. N. Y. C. & R. R. Co.	5,881	155,317	6,814	84,776
Williamstown Col'y	4,553	144,474	....	....
Big Lick Col	3,468	30,193	2,612	63,461
Total	240,903	7,298,311	363,828	4,809,185
1870.		4,809,185	240,903	
Decrease		2,489,126		
Increase			122,925	

* Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending July 8, 1871, compared with week ending July 9, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
C. & O. Canal	13,159	243,909	16,865	327,009
B. & O. R. R.	16,674	426,007	23,278	634,103
H. & B. T. R. R.	4,057	160,065	4,408	189,065
Harrisburg & D.	11,982	403,616	10,280	423,487
L. V. R. R.		8,229		41,737
P. & N.Y.C. & R. Co.	5,201	123,863	5,077	160,786
Cumberl'd Branch Canal	2,337	48,850	4,014	93,281
" " Railroad	1,767	51,098	1,902	39,526
Total	55,177	1,465,637	65,824	1,908,994
			55,177	1,465,637
Increase.			10,647	443,357

Lehigh Canal Coal Trade.

Shipped for the week ending July 7, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region	8267 12	71099 09
" " Beaver Meadow "	715 08	1574 08
" " Tresckow "	2242 05	2675 16
" " Mahanoy "	93 10	1901 06
" " Hazleton "	6661 10	10580 16
" " Upper Lehigh "	477 05	562 00
" " Wyoming "	3413 17	37509 16
Total	21871 07	126503 13
Corresponding week last year	19243 15	219832 13
Increase	2627 12	
Decrease		93329 00

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending July 8, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	13,340 10	219,877 02
" Hazleton	33,114 19	294,880 03
" Upper Lehigh	100 14	683 07
" Beaver Meadow	11,684 13	95,384 04
" Mahanoy	6,868 06	269.570 03
" Mauch Chunk	257 14	5,859 01
" Sullivan & Erie	89 05	173 05
Total Anthracite	65,456 01	886,427 05
Bituminous Coal from all sources		41,737 00
Total by rail and canal	65,456 01	928,164 05
Same time last year	56,747 07	2,013,100 09
Increase	8,708 14	
Decrease		1,084,936 04
Forwarded East from Mauch Chunk by rail	49,385 19	740,380 12
Same time last year	36,736 19	1,648,069 04
Increase	12,649 00	
Decrease		907,688 12

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	49,385 19	740,380 12
To N. C. R. R., at Mount Carmel		2,967 13
Forwarded North from L. & B. Junction	6,814 04	84,950 11
To L. & S. R. R. at Packerton for rail	70 14	3,129 19
Delivered at M'h Chunk	43 01	
Delivered on line of road above Mauch Chunk		484 17
Delivered above Mauch Chunk for use of L. V. R.R.	85 07	5,159 05
To L. & S. R. R., at Penn Hav., for railroad	533 14	2,5,563 06
Do. for canal		94 10
At M. Chunk for canal	6,661 10	15,689 08
Total Anthracite	1,861 12	8,007 03
Bituminous Coal	65,456 01	886,427 05
Total all kinds		41,737 00
	65,456 01	928,164 05

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, July 8, 1871.

	Tons. Cwt.
From Port Carbon	
" Pottsville	
" Schuylkill Haven	23,053 10
" Port Clinton	2,302 00
Total for week	25,355 10
Previously this year	327,965 00
Total	353,320 10
To same time last year	88,605 17

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, July 8, 1871.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	30,174 08
" Port Carbon	4,730 06
" Pottsville	1,923 01
" Schuylkill Haven	28,897 04
" Pine Grove	4,311 16
" Tamaqua	15,368 07
" Harrisburg	
" Dauphin	2,926 07
Total	88,331 09

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	9,852 11
" Mill Creek "	1,116 01
" Schuylkill Valley Scales	845 19
" Mt. Carbon "	795 11
" Cressona "	10,700 09
" Pine Grove "	
" Tamaqua "	1,719 14
Total	25,030 05

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	1,567 13
" Shamokin	1,827 13
" Herndon	
Total	3,395 06

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,045 19
" Lebanon & Pine Grove Branch	828 09
Total	1,874 08

CONSUMED ON LATERALS.

From Frackville Scales	758 12
" Mill Creek "	93 13
" Schuylkill Valley Scales	131 01
" Mt. Carbon "	349 07
" Cressona "	108 16
" Pine Grove "	8 01
" Tamaqua "	181 06
Total	1,630 16

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a tr.	49 09
" " Alburtis, " "	41 04
" " Oreland, G. & N. Br.	1,593 18
" " Connecting R. R.	
" " Willow Street R. R.	499 02
Total	2,183 13

BITUMINOUS.

From Harrisburg	7,354 02
" Connecting R. R., G. & N. Br.	
" Junction R. R.	39 10
Total	7,393 12

COAL FOR COMPANY'S USE.

Anthracite	1,427 15
Bituminous	244 09
Total	1,672 04

RECAPITULATION

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val. Branch	88,331 09	25,942 11	↑ 62,388 06
For Shipment by Canal	25,030 05	4,696 19	↑ 20,333 06
Shipped Westward via Northern Central R. R.	3,395 06	39 15	↑ 3,355 11
Shipped West or South from Pine Grove	1,874 08	102 16	↑ 1,771 12
Consumed on Laterals	1,630 16	1,907 02	↓ 23 14
Lehigh and Wyoming Coal	2,183 13	2,042 15	↑ 140 18
Total Anthracite paying fr'gt	122,445 17	34,431 18	↑ 88,013 19
Bituminous	7,393 12	6,745 03	↑ 648 09
Total of all kinds paying fr'gt	129,839 09	41,177 01	↑ 88,662 08
Coal for Company's use	1,672 04	1,074 14	↑ 597 10
Total Tonnage for Week	131,511 13	42,251 15	↑ 89,259 18
Since Dec. 1, 1870	2488089 16	1788162 09	↑ 699927 07
Total to date	2619601 09	1830414 04	↑ 789187 05

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	23,053 10	8,050 09	↑ 15,003 01
" Port Clinton	2,302 00	249 00	↑ 2,053 00
Total Tonnage per Week	25,355 10	8,299 09	↑ 17056 01
Since Dec. 1, 1870	327,965 00	80,749 00	↑ 24721600
Total to date	353,320 10	89,048 09	↑ 26427201

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending July 8—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons ct.	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	32105 02	19788 19	505342 00	592077 00
Upper Lehigh Region	2744 05	2401 04	11249 00	67883 00
Beaver Meadow Region		4335 06		52035 16
Hazleton Region	6731 00	8940 12	10629 10	111124 06
Mahanoy Region		88 16		564 00
Tresckow Region	2287 06		5198 19	
Mauch Chunk Region	5956 08	382 18	67885 14	30570 10
Totals	49824 01	35907 15	600305 03	854254 12
Increase	13916 16		253949 09	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	32074 15	12579 00	475097 08	494580 04
Forwarded East of Mch Chunk by Canal	13085 16	18866 00	58176 05	223370 03
Delivered at and above Mauch Chunk	774 12	737 19	28444 08	21008 19
Delivered to L. & B. R. R. at Plymouth Bridge	3447 00	3432 08	19293 17	102167 17
L. V. R. R. at Packer'n	441 18	292 08	19293 05	13227 09
Totals	49824 01	35907 15	600305 03	854254 12
Of the above there was transported on acc'nt of L. C. & N. Co.	8446 11	382 18	88665 02	47224 07
W.-B. C. & I. Co.	21567 16	10347 12	385640 18	262355 06
Totals	30014 07	10730 10	474306 00	309579 13
Increase	19283 17		165762 07	
Decrease				

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending July 8, 1871.

	WEEK.	SEASON.
By Delaware and Hud. Canal	28,541 00	246,642 00
By Railroad East	10,083 00	110,416 00
" West	3164 00	27,670 00
" South	8746 00	94,657 00
TOTAL TONS,	50,534 00	479,385 00
For the same period last year.		
By Delaware and Hudson Canal	34,406 00	681,465 00
By Railroad East	4472 00	205,339 00
" West	1573 00	40,172 00
" South	9247 00	227,454 00
TOTAL TONS,	49,698 00	1,154,430 00

Delaware, Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending July 8, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	13,936 03	114,979 10
Shipped South	39,154 15	281,053 13
Total	53,090 18	396,032 03
For the corresponding time last year:		
Shipped North	12,771 08	348,756 04
Shipped South	26,945 06	921,994 04
Total	39,719 14	1,270,750 08
Increase	13,371 04	
Decrease		874,718 05

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending July 8, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	2,3018 13	174,719 02	20,708 04	574,502 04
" Canal	846 19	3,369 11	357 19	7,764 08
Total	23,865 12	178,088 13	21,066 03	582,266 12

Decrease 1871, 404,177 19 tons.

Shamokin Coal Trade.

For week ending July 8, 1871	8,690 08
Same time last year	10,587 11
Increase	1,897 03
Decrease	
Total amount shipped to date	316,890 17
Same time last year	175,300 11
Increase	141,590 06
Decrease	

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, July 8, 1871 :

	tons. cwt
From St. Clair	30,174 08
" Port Carbon	4,730 06
" Pottsville	1,923 01
" Schuylkill Haven	28,897 04
" Auburn	6,194 13
" Port Clinton	15,338 07
" Allentown and Alburtis	90 13
" Harrisburgh and Dauphin	10,280 09
Total paying freight	97,659 01
Coal for Company's use	1,672 04
Total for week	99,331 05
Previously this year	1,886,372 09
Total	1,985,703 14
To same time last year	1,577,497 00

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Campany for the week ending Saturday, July 8, 1871.

	WEEK.	SEASON.
North	45,049 05	339,647 05
South	8,745 17	94,657 03
Total	53,795 02	434,304 08
Corresponding time in 1870 :		
North	31,615 11	1,174,802 13
South	9,247 01	227,454 01
Total	40,862 12	1,402,256 14
Increase North	13,433 14	d 835,155 08
Decrease South	501 04	d 132,796 18
Total increase	12,932 10	d 967,952 06

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday July 8, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B. &O. R.R. C. Tons. Cwt	Total. Tons Cwt.
1871	16,864 13	23,278 07	40,143 00
1870	13,159 00	16,674 06	29,833 06
Increase	3,705 13	6,604 01	10,309 14
Decrease			

YEAR.

1871	327,008 13	634,103 03	961,111 16
1870	243,909 09	426,007 09	669,916 18
Increase	83,099 04	208,095 14	291,194 18
Decrease			

Cumberland Branch

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B.&O.R.R. Co Tons Cwt.	Total. Tons. Cwt.
1871	4,013 14	1,901 15	5,915 09
1870	2,336 18	1,766 13	4,103 11
Increase	1,676 16	135 02	1,811 18
Decrease			

YEAR.

1871	93,281 06	39,526 09	132,807 15
1870	48,849 19	51,097 19	99,946 19
Increase	44,431 07		32,860 16
Decrease		11,570 11	

Huntington and Broad Top R. R. Co.

For week ending July 8, 1871	4,408 tons.
Same time last year	4,057 "
Increase	357 "
Decrease	....
Total amount shipped to date	189,065 "
Same time last year	160,048 "
Increase	29,017 "
Decrease	....

Report of Coal forwarded by Pa. & N. Y.

R. R. Co., for week ending July 8, 1871.

	BITUMINOUS. Tons.	Cwt.	ANTHRACITE. Tons.	Cwt
By Rail	5,077	00	6,814	04
Previously this year	155,709	07	77,962	02
Total by Rail	.....		.....	
By Canal	.....		.....	
Previously this year	.....		.....	
Total by Canal	.....		.....	
Total for the year	160,786	07	84,776	06
To the same time last year	123,863	00	155,317	09
Increase	36,923	07		
Decrease			70,541	03

Company Coals.

July, 1871.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton E. Port	4 70	4 80	5 10	5 50	5 75	4 75
*Pittston at Newburgh	4 50	4 50	4 70	4 80	5 00	4 30
*Lackawana at Road't	—	—	—	—	—	—
Wilk'b're at Hoboken	4 75	4 75	5 00	5 25	5 75	4 75
Old Co. Lehigh at Pt John'n	6 25	—	5 65	5 50	6 00	5 00
Lehigh at Eliz. Port	6 25	—	5 65	5 50	6 00	5 00

For freights to different points see "Freights."
* To contractors.

Line Prices for Coal July, 1871,

	Lump	Broken	Egg	Stove	Ches't
At Mauch Chunk	4.50	4.00	4 00	4.25	3.50
" Wilkesbarre	3 75	3.75	3.75	4.00	3.25

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK. July 7. R. A.	W. A.	AT PHILADELPHIA. July 6. R. A.	W. A.
SCHUYLKILL.				
Lump	$ —	$ —	5 50	4 50
Steamer	6 00	—	—	4 50
Broken	6 00	—	—	to 4 75
Egg	6 25	—	—	to 4 75
Stove	6 50	—	—	to 5 00
Chestnut	5 75	—	—	to 4 25
Pea	—	—	—	—
LEHIGH.				
Lump, (along side)	6 75	—	—	—
Broken	6 10	—	—	—
Egg	6 00	—	—	—
Stove	6 50	—	—	—
Chestnut	5 50	—	—	—
Pea	—	—	—	—
SPECIAL COALS.*				
Diamond Vein	R. A. 5 50@7 00		—	—
New England	" —		—	—
Locust Mountain	W. A. 6 50		—	—
Honey Brook, L'h	W.A. 5 00@6 25		—	—
Spring Mountain	" " 5 00@6 25		—	—
Sugar Creek	" " 5 00@6 25		—	—
Sugar Loaf	" " 5 00@6 25		—	—
Old Comp'y's	" " 5 00@6 25		—	—
Cross Creek	" " 5 00@6 25		—	—
Room Run	" " 5 00@6 25		—	—
Girardville	" "	—	—	—
McMichael	" "	—	—	—
Shamokin	" "	5 25	—	—
Lykens Valley	" "	5 75	—	—
Broad Top	" "	5 25	—	—
Hill & Harris	" "	5 25	—	—
Henry Clay	" "	—	—	—
Powelton	" "	5 25	—	—

*Dealers in these coals may be found in our advertising columns.

Prices at Baltimore—July, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 25@5 50
Pittston and Plymouth, do	5 25@5 40
Shamokin Red or White Ash, do	5 25@5 40
Lykens Valley Red Ash, do	— —@5 80
Zerba Valley	— —@— —
Treverton	— —@— —
By retail, all kinds per ton of 2240 lbs.	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	— —@4 75
Fairmount and Clarksburg gas, f. o. b. at L. Point	6 00@6 50
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein..f.o.b. at Phila	$ —
Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. " "	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

July, 1871.

George's Creek and Cumberland f. o. b. for shipping...$4 50@4 60,

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 50@5 75
Lykens Valley	6 00@6 25
Shamokin Red or White Ash	5 50@6 00
Trevorton and Zerba Valley	— —@— —

Prices of Gas Coals.

July, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

Duty, $1 25, gold

	Coarse	Slack.
Block House	$1 75 @-1 75	
Go wrie	1 75 @-1 75	

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 10 @7 25
Fairmount Gas Coal Co. of N. Y.	7 50 @- —
Despard Coal Co	$7 50 @- —
Penn	7 75 @8 00
Newburg Orrel Gas	- — @- —
West Fairmount Gas Coal	8 00 @- —

AT PHILADELPHIA.

Powelton	.$7 75

TO NEW YORK.

Provincial.	
Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—
TO BOSTON.	
Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Prices of Foreign Coals.

June, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, N. Y.

Liverpool Gas Coking	$ 9 00@— —
" " Cannel	11 50@12 50
" House "	— —@16 00
" Orrel	12 00@14 00
Per ton 2,240 lbs., ex-ship.	
PRICES FROM YARD.	
Liverpool House Orrel, screened	$16 60@17 50
" Cannel, "	18 00@20 00
Per ton 2,000 lbs. delivered.	

Foreign and Provincial Freights.

June, 1871.

Foreign.	
Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	12s @15s ton.

Freights.—June, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philadel'a.	Anthracite. From East Port, Port Johnson, and Hoboken.	Anthracite. From Newburg.	Anthracite. From Rondout.
Amesbury			$2 50	$1 75		
Bangor	$2 75		2 30	1 50		
Bath	2 75	2 75	2 30	1 75		
Boston	2 60	2 50	2 25	1 50	180	1 80
Bridgeport	2 25	2 25	1 80	1 00	1 10	1 25
Bristol		2 60	2 60	1 25		1 55
Cambridgeport			2 75	1 75		
Derby			2 60	1 20		
Dighton	2 30	2 35	2 30	— —		
East Cambridge			2 35	1 75		
Fall River	2 25	2 25	2 25	1 25	1 40	
Hackensack			1 75	1 00		
Hartford	2 75		2 30	1 60		
Jersey City		2 00	1 40	50	1 70	
Middletown			2 25	1 30		
Mystic			— —	1 30		
New Bedford	2 50	2 35	2 00	1 25		
Newburyport	2 75		2 40	1 60		1 35
New Haven	2 25	2 25	1 90	1 00	1 10	2 20
New London	2 25	2 25	1 76	1 10		1 25
Newport			2 00	1 30		1 40
New York	2 00	2 00	1 35	50	70	65
Norwalk			1 80	1 00	1 10	
Norwich	2 25	2 25	2 00	1 20	1 40	1 50
Pawtucket	2 50	2 40	2 30	1 40		1 65
Portland	2 50	2 60	2 30	1 50		2 00
Portsmouth, N.H	2 75	2 75	1 45	1 00		1 50
Providence	2 25	2 25	2 00	1 40	1 50	
Rockport			2 10	1 65		
Saco	2 75		2 25	1 75		
Sag Harbor			1 70	1 20		
Salem	2 60	2 75	2 35	1 50		
Stamford			2 00	1 00	1 10	
Stonington			2 00	1 25	1 20	1 40
Taunton			2 30	1 40		
Warren			— —	1 30		
Washington			1 25			
TO RIVER PORTS.						
Albany		80			55	
Catskill		70			50	
Cockzackie		70			50	
Coeyman's		70			65	
Cold Spring	2 20	70			30	
Fishkill		70	1 60		30	
Haverstraw					60	
Hudson	2 20	2 25			40	
New York					60	
Nyack			1 75		30	
Poughkeepsie					30	
Rhinebeck						
Rondout					75	
Saugerties			1 60		40	
Sing Sing					75	
Stuyvesant					75	1 1
Tarrytown					75	
Troy					55	
West Point			1 75			
Yonkers					60	

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$1 95
For reshipment	1 85

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 84
C. R. R., N. J., Phillipsburgh to Elizabethport	1 25
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 44

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 84
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 25
Shipping expenses	25
Wharfage	10
Total	$2 44

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 84
Morris & Essex R. R. Phillipsburgh to Hoboken	1 45
Shipping expenses	25
Warfage	10
Total	$2 64

TO SOUTH AMBOY.

L. V. R. R.	84
B. & D. R. R.	1 15
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 24

PENN HAVEN TO ELIZABETHPORT.

L. V. & R. Penn Haven to Phillipsburgh	99
C. RR. of N. J. Phillipsburgh to Elizabethport	125
Shipping expenses	25
Wharfage	10
Total	$ 2 59

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	Toll	$1.25	Freight, 90c	$2 15
" Port Carbon	"		"	
" Port Clinton	"	1.17	" 8 c.	2 02

TO NEW YORK.

From Schuylkill Haven....Toll..1 25 Freight..$1 90..$3 10

The Rates of Toll on Lump and Steamer Coal will be ten per cent less than the above rates. The charge will be per ton of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$ 80
Freight and towage	1 10
Total	$1 90

TO NEW YORK.

Lehigh Canal	$ 50
Morris Canal	2 11
Freight	
Towing	
Total	$2 61

TO JERSEY CITY.

Lehigh Canal	$ 50
Morris Canal, Freight	2 09
For re-shipment	2 59

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Towage	20
Total	$2 51

TO NEW BRUNSWICK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Total	$2 31

MARKET REVIEW.

FOR THE WEEK ENDING JULY 15, 1871.

IRON.—The demand for Scotch Pig continues light, but there is increased firmness on the part of holders, and the market closes with an upward tendency; 100 tons Glengarnock sold at $32, and 200 do. Eglinton, to arrive, $31. The transactions in American are still restricted by the limited supply, and prices are in sellers' favor. There has been quite an active inquiry for Wrought Scrap, and sales have been made of 800 tons, to arrive, on private terms. New Rails continue in demand at steady prices, and we notice sales of 3000 tons, 56 lb., English, at a private price; and 200 do. Old Double-headed, $39 50, gold. Refined Bar is yet without change, the market being quiet at old figures—in Philadelphia, makers have advanced their price for ordinary assortments to $78 68 f. o. b. Russia Sheet continues very firm, and Nos. 14 and 15 are scarcely to be had at any price—200 packs assorted, sold on private terms—we quote 12¼c.@12½c., gold, firm.

Import of Iron into New York, from January 1st to June 30th, 1871:

	BAR.	PIG.	SHEET, &c.
From For. Ports	tons 9.530	tons.41,716	bdls.161,088
Coastwise	2	16	1,771
Total	tons.9,532	tons.41.732	bdls.162,859
Same time 1870	tons.7,064	19,610	116,780

LEAD.—Pig remains quite dull and we hear of no sales; we quote ordinary Foreign $6 12½c., and Refined and Selected $6 37½@$6 50, gold, Bar 9¼c., Pipe and Sheet 10¼c., and Tin-lined Pipe 15c., all less 10 per cent. to the Trade.

Import of Lead into New York from January 1st to June 30th, 1871:

From Foreign Ports	pigs.288,609
Coastwise Ports	29,800
Total	pigs.318,409
Same time, 1870	256,245

COPPER.—The manufacturers of Copper and Yellow Metal are steady at our quoted rates. The market for Ingot continues active, and prices still favor sellers, the large movement, or negotiations, alluded to in our last, has been consummated, the purchases embracing about 6,000,000 lb. Lake for delivery up to the close of December, at 22c. We notice besides 700,000 lb. Lake, on the spot, at 21¾c.@22c., the latter price now demanded; and 400,000 lb. for export, the first movement in that direction for about a year, on private terms.

SPELTER.—Foreign is very quiet, and we have only to notice sales of 25 tons at 5¼c.; and 22 do. G. H., the first received here in a great many years, 6¼c., gold.

Import of Spelter into New York, Jan. 1st to June 30, 1870: 1871.....plates.135,939 | 1870.....plates.119.001

STEEL is unchanged.

TIN.—The accounts from abroad continue favorable for Pig, a further advance having taken place both in England and in Singapore, and the market is active and buoyant, with prices a little higher than at our last writing. Sales have been made of 5,800 slabs Straits, including 3,600 slabs, to arrive here and at Boston, at 34¼c.@34⅝c., 30 days; 50 tons English, 34c.@34½c.; and 450 slabs Banca, 39½c.@39¾c., closing quite strong, at 25c. for Straits, with small sales 34½c. for English, and 40c. for Banca, all gold. The latest dispatches quote Straits in London £131, and English reported, £137; at Singapore, Straits $33 50 ₱ picul. Plates continue in very active request, at prices in sellers' favor, the tendency being steadily upward. Prices here are said to be more than $1 ₱ box under the present English quotations. It is understood that large orders are in the market from the West. Notwithstanding the large sales reported in our last, they were considerably short of the business done, the transactions footing up not less than 15,000 bxs. for the week. We have now to notice sales of 1,350 bxs. Assorted Charcoal Tin at $8 62½@$8 75 for I. C.; 250 do. one-third X only, $8 75; 1,550 do. Charcoal Terne, $8@$8 75; 500 do. to arrive, $8 12½; 250 do. S. T. P., $8 50; 700 do. I. C. Coke, 10 by 14, $8@$8 25; $250 do. $7 75; 400 do., 14 by 20, B. C., $7 50; 250 do. 10 by 14 and 14 by 20, $7 87½; 150 do. Coke Terne, B. C., $6 25, all gold; and 1,000 do. Charcoal Tin, on private terms.

Import of Tin into New York, from Jan. 1 to June 30:

	1871.	1870.
PIGS	No. 38,866	41,920
PLATES	bxs.537,047	428,151

ZINC.—American Oxide, 6½c.@7c.; French, 9½c.@10½c.; Sheet, 8¾c.@9¼c.; Manganese, 4½c.@5c. Sales 35 casks Mosselmann from a dealer's hands at 7@7¼c., gold.

METALS.

NEW YORK, July 12, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, $7 ₱ ton; Polished Sheet, 3 cts. ₱ lb; Galvanized 2¼; Scrap Cast, $6; Wrought, $8 per ton.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	30 00@34 00
Pig, American, No. 1	35 00@— —
Pig, American, No. 2	32 00@— —
Pig, American, Forge	31 00@32 00
Bar Refined, English and American	72 00@73 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes	105 00@115 00
Bar, Refined, ord'y sizes	75 00@— —
Bar, Refined, ¼ @ 5-16 inch	82 50@— —
Bar, Common	70 00@ 72 50
Scroll	95 00@125 00
Ovals and half-round	95 00@120 00
Band	90 00@ 95 —
Horse Shoe	95 00@100 00
Rods, ⅝ to 3-16 inch	82 50@120—
Hoop	100 00@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to assortment (gold)	12¼@12½
Sheet, Single, D, and T. Common	4½@— 5¾
Sheet, Galv'd, Nos. 14 to 26	12@14 — 37 ₱ ct. dis.
" " Nos. 27, 28, and 29	15@18 — 30 ₱ ct. dis.
Rails, English (gold), ₱ ton	— — @57 00
Rails, American, at Works in Pa	70 00 @72 00

STEEL.—Duty: Bars and Ingots, valued at 7 cents ₱ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 3½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 12 @— 14
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 15 @— 16
American, Spring, do.	— 9 @— 11
American Machinery, do.	— 10 @— 11
American German, do.	— 9 @— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	36 @— 38
Copper, Old Sheathing, &c. mixed lots	— @— 19
Copper, old, for chemical purposes, 14@16 oz.	20 @— 21
Copper, American Ingot	21¾@— 22
Yellow Metal, New Sheathing & Bronze	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2½ cents ₱ lb.

Galena, ₱ 100 lbs	$— @— —
Spanish (gold)	6 12½@6 15
German, do.	6 12½@6 15
English, do.	6 15 @6 50
Bar (net)	9 25 @— —
Pipe (net)	— — @10 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ₱ lb.

SPELTER.—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	5 75 @ 6 25
Plates, Domestic p. lb.	— 7 @— 11

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent.; Roofing 25. ad val.

	Gold ₱ lb.
Banca	— @40
Straits	33¾@35
English	34½@

PLATES.

Fair to Good Brands.	*Gold.*	*Currency.*
I. C. Charcoal, ₱ box	$8 62½@9 00	$10 25 @10 75
I.C. Coke	7 50 @8 50	9 00 @10 00
Coke Terne	6 25 @7 50	7 25 @ 9 00
Charcoal Terne	8 00 @8 50	9 50 @ 10 00

ZINC—Duty: Pig or Block, $1 50 ₱ 100 lb.; Sheet, 2½ cts. ₱ lb.

Sheet, No. 9 to 11 Foreign ₱ lb.	— 8¼@ 9¼

Mining Stocks.

NEW YORK, July 13, 1871.

The following report of the Mining Stock Board is almost a fac-simile of the one given in our last. Central La Crosse and Grass Valley are weaker, all other stocks on the list are unchanged. No sales. Canada Mining "Copper" is quoted at 55.

GOLD STOCKS.

	BID.	ASKED.
American Flag	15	25
Bates & Baxter	30	—
Benton	—	19
Black Hawk	75	85
Central Gold	6	9
Cons Gregory	—	50
Grass Valley	6	11
Gunnell	17	—
Holman	—	—
La Crosse	18	21
Liberty	—	3
Mariposa prf.	—	—
Montana	—	—
Rocky Mount	4	5
Quartz Hill	—	30
Smith & Parmlee	—	45
N. Y. & Eldorado	—	—

Petroleum is decidedly inactive. No sales have transpired since our last. Bennehoff Run has slightly advanced. Central and Rynd Farm have reacted. With those exceptions all other stock on the list are unchanged. The report is as follows:

PETROLEUM STOCKS.

	BID.	ASKED.
Bennehoff Run	22	27
Bergen Coal and Oil	15	
Bliven Oil	30	
Blood Farm	—	
Breevoort	30	
Buchanan Farm	40	
Central	65	
Clinton	—	
Home	165	185
National	—	
New York & Allegheny	60	
Northern Light	30	
Phillips Pet		20
Pithole Creek	—	—
Rathbone Oil	24	
Rynd Farm	35	37
Second National	—	
Sherman & B	—	
Tarr Farm	—	
United Petroleum Farms	30	33
United States	—	70

San Francisco Stock Market.

"By Telegraph."

Our report from the San Francisco Mining Stock Board is dated July 12th. The report does not evince as much activity in the Board as has been noticed for some time past. It is possible the hot weather has its corresponding influences on our friends on the Pacific Coast that apparently affects stock operations here. Gould & Curry and Belcher have advanced. All other stocks on the list are weaker. The report is as follows:

Savage	41
Yellow Jacket	69
Kentuck	No sales
Chollar Potosi	47⅞
Gould & Curry	104
Belcher	188
Imperial	37
Amador	—
Crown Point	No sales
Hale & Norcross	—

Weekly Slate Trade Report—Hydeville.

ROOFING SLATE.

Week ending July 8, 1871.

NAME OF COMPANY.	WEEK.	PREVIOUSLY.	TOTAL FOR YEAR.
Eagle Slate Co	....	2825	2825
Western Vermont Slate Co	8	306	514
Blue Slate Co	....	1430	1430
The Evergreen Slate Co	111	2423	2534
Forest Mining Slate Co	....	409	409
West Castleton Slate Co	....	....	....
E. D. Billings	....	614	694
R. M. Copeland	....	404	404

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N. Y., via the R. & S. R. R., for the week ending July 8 and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
†Penrhyn Slate Co	70	2480	2550
New York, and Middle Granville Slate Co. *	120	2660	2780
†American Slate Co	....	....	....
Benj. Williams	95	785	880
Jones & Williams	....	90	90
Eagle Slate Co	30	205	235
Mettowee Slate Co	50	455	505
Albany Slate Co	....	375	375
H. W. Hughes	....	30	30
Total	....	....	....

MILL STOCK, MANTLES, &c.

NO OF CASES SHIPPED BY	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	160	2458	2618

BLACK BOARDS.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	....	....	....

MILL STOCK, &C.

NO. OF CAS SHIPPED BY,	WEEK.	PREV'Y.	YEAR.
Eagle Slate Co	2	17	19
Penhryn Slate Co	....	....	...

* Sales made together this season.
† Consolidated Sales.

The Atomic Weights of Nickel and Cobalt.

MR. RICHARD H LEE, of the Lawrence Scientific School, has recently made at the suggestion of Prof. GIBBS, an investigation regarding the weights of cobalt and nickel, which have long been the subject of controversy. The atomic weight of cobalt he finds, from the mean of eighteen determinations, to be 59.10; that of nickel, from twelve determinations, 58.10.

The Louisiana Sulphur Mines.

THE discovery of a bed of sulphur, a hundred feet in thickness, by the Calcasieu Sulphur Mining Company, of Louisiana, seems to be creating quite a stir in that State. Before the first company have fairly begun their shaft to reach the mineral treasure, a second company has been formed and another tract of land purchased for sulphur mining.

The new company is called the American Sulphur Mining Company. They have purchased two tracts of land in the immediate vicinity of the Calcasieu Company, and will soon begin mining operations.

DEPARTMENT OF POPULAR SCIENCE.

Sensations of Temperature.

This exceedingly warm weather, Madam, brought on, no doubt, by the enormous combustion of fireworks throughout the country, in honor of our national anniversary, leads me to speak of the sensation of temperature, which is, as you remember, one of the two functions of the sense of touch. To be candid, that was the subject upon which I had determined to talk with you, before the hot spell came upon us. But we will make believe that the topic has arisen accidentally, and that I am about to enlighten you out of the fullness of my knowledge, as truly learned men can do, who hold themselves ready to serve hot meals of well-cooked erudition at all hours, and at a moment's notice. As I could not hope to humbug a person of your acuteness, I will confess that I have been "cramming" a very little—just refreshing my memory, you know—since our last conversation; and I have found a most convenient help in a series of interesting (though somewhat long-winded) articles on the senses, translated from a German periodical, and published in the Smithsonian reports for 1865 and 1866. You did not know that the Smithsonian reports contain interesting articles? Then you have never looked into them, and you had better take them down from the shelf where they have gathered dust, in company with other "Pub. Docs," ever since your husband went to Congress. I am afraid congressmen don't read them much; but they are really fascinating, if you will only skip all the parts relating to SMITHSON'S will, barometrical observations, and a few other dry but necessary matters.

Well, as I was saying, when you significantly wound up the clock, the other evening, the sense of touch proper includes the sensations of temperature and pressure. A sensation of the former class is produced whenever the temperature of the skin changes. An addition of heat from without produces the sensation of warmth; a withdrawal of heat, that of cold. The same causes operating upon the nerves elsewhere than at their extremities produce merely pain. Hence, the thermometrical apparatus must be located at the outer extremities, close under the skin. Of these numerous, minute and sensitive living thermometers, we know nothing; but we can plainly perceive that they differ in some important respects from the mercurial thermometer with which we are familiar.

In the first place, we cannot reduce our sensations of temperature to a graduated scale. We can feel that they differ in intensity, but we cannot say exactly, either what is their relative or their absolute degree. Even if we could measure by consciousness the difference between two temperatures, we still lack a definite standard to which both can be referred. The mercurial thermometer has a zero, which is fixed by the freezing of water.* But our thermometer of sensation has a fluctuating zero, namely, the absence of all feeling of temperature. This occurs, not when any particular, constant temperature has been attained by the skin, but when the temperature of the skin, whatever it may be, is not changing. Put your hand in water of 50°, and it will feel cold, because it has a lower temperature than that which the blood maintains in your skin, and abstracts heat from the skin faster than the blood can supply it. Now put your cold hand into water at 60°. At first it will feel warmth, because the skin is absorbing heat from the water; presently it will feel for a very short period neither cold nor warm, because the temperatures of the two are equal; but the blood is much warmer than 60°, and, having overcome its temporary disadvantage, will assert itself through the skin, giving heat to the water; and immediately you feel cold, though the mercury would show but little change in the temperature of the water, and indeed, that temperature is actually increasing.

Moreover, the rate at which a substance abstracts heat from the skin disturbs our estimate of its temperature. If an axe lies out-doors through a frosty night, the handle and the head will acquire the same temperature; but the head will feel much colder than the handle, because iron is a very good, and wood a very bad, conductor of heat.

Again, the mind is sometimes deceived into mistaking quantity of sensation for intensity. Thus, if you dip into the water at 50 deg. the whole hand, it feels colder than if you test it with one finger only, because a greater number of nerves are simultaneously excited.

If you watch closely, you will perceive another curious thing, when immersing the hand in water of low temperature. The back of the hand feels the cold sooner than the palm. This is because the skin is thinner there; and in this respect your hand is like an ordinary thermometer, which notes changes of heat less quickly when the tube and bulb are made of thick glass. But at last the palm feels colder than the back, because it contains the extremities of a greater number of nerves.

Yet, strange to say, our sense of touch, though so much less inexact, is very delicate. If you put the same finger, first into one vessel of water, and then immediately into another, you will be able (at least after some practice) to tell which is the warmer, though the difference be only a fraction of a degree.

We almost always say an object is cold or hot, when it makes us feel cold or warm. Yet what we really experience is in ourselves, and not in the object. Generally we experience at the same time a sensation of pressure, as the object touches us; and this helps the illusion. Only when the pressure is absent (as, for instance, when we stand in a still, cold air) can we easily realize that the coldness is a state of our own nerves.

I feel sure that something will occur at our next meeting, enabling me to introduce in a graceful way the sensation of pressure, so intimately connected with that of temperature. At present, by way of illustrating both subjects at once, I press your hand warmly, Madam, and say good-by. R. W. R.

* FAHRENHEIT called a point 32 degrees below the freezing-point zero, because he thought this was the lowest degree of cold occurring in nature, on the earth. But he was mistaken in this: and his zero has no significance. But its position is really fixed, like that of the zero of CELSIUS and REAUMUR, by the freezing-point.

New Publications.

THE EYE IN HEALTH AND DISEASE: being a series of articles on the anatomy and physiology of the human eye, and its surgical and medical treatment. By B. Joy JEFFRIES, A. M., M. D. Fellow of the Mass. Med. Society, etc., etc. Boston: Alexander Moore. New York: Lee, Shepard, and Dillingham. 1871.

This excellent little series of articles, now collected and published in book form, was written, as the author says, "for the instruction of the laity in reference to the care of the most wonderful and delicate organ of the body," and succeeds in accomplishing its object far better than works of its character generally do. The language used throughout is such as to be readily understood by every intelligent reader, while at the same time it shows that the author is a scientific man, and thoroughly master of the subject of which he treats. In a word, the work is entirely free from any taint of quackery—a result as desirable as it is rare at the present day, when many books, pretending to popularize medicine are *really* intended solely to advertize the author, who, it is almost needless to add, is frequently an illiterate humbug.

The first chapter explains clearly the anatomy of the eye, the muscles by which it is moved, the uses of its different coats, the media through which the light must pass and the influence they exert in bringing to a focus the rays coming from the object at which we are looking. Practical hints are also given with reference to the removal of foreign bodies from the lids.

The next article treats of the physiology of the eye and explains particularly what is known as *accomodation*, or the process by which the eye adapts itself to the distinct vision of near and distant objects. Then follow remarks on the use of spectacles in old age, in near-sightedness in long-sightedness and in astigmatism, showing the necessitity, which every physician knows to exist, for having glasses selected to suit each particular case, in accordance with rules familiar to every oculist, but of which other than professional men are usually ignorant.

The article on cataract explains the nature of that formidable disease—what it is not, as well as what it is—and the nature of the operations resorted to for its removal. The remarks on artificial eyes are interesting to those, at least, who do not contemplate the necessity of making any more intimate acquaintance with them.

The subject of squinting is next clearly discussed and the operation for its removal explained. Then follows an explanation of the ophthalmoscope, that wonderful instrument by the aid of which the oculist can examine the interior of the eyeball, without in any way injuring it or hurting his patient, almost as satisfactorily as he could with his scalpel and forceps.

The book is ended with some general remarks, sensible and practical, on injuries and diseases of the eyes and lids, and there is appended a set of *test types* by which the reader can readily ascertain whether or not his vision is perfect and whether it is rendered so by a given pair of spectacles.

There is, of course, little in the book that would be new to a physician well-informed on this particular branch of his profession; but we can heartily commend its perusal to any of our non-professional readers who desire reliable information on this subject in language which they can understand.

The Composition of Flue-Dust from Blast-Furnaces.

THE following interesting note of some experiments by a celebrated English metallurgist we take from the *Mechanics' Magazine*:—When Cleveland ironstone is melted, dense fumes are emitted from the furnaces, which condense for the most part in the flues now commonly employed for utilization of the waste heat. In this condensed matter—technically known as flue-dust, zinc is always found, and frequently manganese, copper, titanium, and more rarely other metals also. Mr. J. LOTHIAN BELL has by this circumstance been induced to compare the power of splitting up carbonic oxide, of metals thus often found associated with iron in its ores with that of iron itself. Every care was taken to ensure the purity of the carbonic oxide, as if a trace of cyanogen be present and carbonaceous deposit, probably paracyanogen, would be likely to be formed. The oxides of the respective metals were exposed in his experiments for many hours, at the temperature of melting zinc to currents of the gas, and in no case was any deposit of carbon discoverable, save when traces of iron were present. Mr. BELL has extended his experiments, treating in the same manner chromic-oxide, lead-oxide, nickel-oxide, and is still pursuing the investigation. Wherever a reaction takes place, as far as he has as yet proceeded, the oxide of the metal is either entirely or partially reduced, and the carbonic oxide converted into carbonic acid.

The Revival of Ancient Fire-Arms.

THE Cuban rebels are said to have resorted to the use of leather guns, a species of artillery used by GUSTAVUS ADOLPHUS and other European commanders in former times. The leather while wet is tightly stitched round a wooden core or mould, in successive jackets, the under one being allowed to dry before the next is put on. A close and tight coil of good rope or cord completes the tube, the breech being made of ha d wood, lined with tin. Such guns will fire some twenty rounds before giving way. We should, however, like to know what chance had the artillerymen on the twentieth round? The advantages they present are cheapness and easiness of construction, and portability, as a couple of them, with a four-inch bore, can be carried by one man.—*Mechanics' Magazine.*

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
WILLARD P. WARD, M. E.,
Editors.

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CONTENTS FOR THIS WEEK.

The Effect of Atmospheric Pressure on Boilers	33
A Chilian Method of Amalgamating Silver Ore	33
The Viaduct Railroad	33
Smelting Processes at Freiberg	34, 34
The Physical Condition of the Sun	34, 35
The Oil-bearing Limestone of Chicago	46, 36
Phosphatic Sand in South Carolina	36
American Glacier	36
The Durability of Iron Structures	36
THE COAL TRADE	37, 38
MARKET REVIEW	39
The Atomic Weights of Nickel and Cobalt	39
The Louisiana Sulphur Mines	39
DEPARTMENT OF POPULAR SCIENCE—	
Sensations of Temperature	40
Few Publications	40
The Composition of Flue-Dust from Blast-Furnaces	40
The Revival of Ancient Fire-Arms	40
The Rigi Railroad	41
Tyndall on Light and Electricity	41
Freiberg Smelting Process	41
Obituary	41, 42
A New Method for the Separation of Gold and Silver on a Large Scale	42
New English Inventions	42
MINING SUMMARY	43, 44
Advertisements	44, 48

The Rigi Railroad.

OUR readers will doubtless remember a description of this railroad, which was given in our columns some time since. It may, however, be well to recall a few of the prominent features of the road, for the benefit of those who are interested in mountain railways, and have not read our description of the one which has but recently been completed up the Rigi, from the Lake of Lucerne. A centre rail, composed of two side pieces, placed at the proper distance apart, and kept in position by bolts, which at the same time formed the teeth of the rack, was placed between the rails of an ordinary track. The locomotive was provided with a central toothed wheel, which engaged the teeth of the centre rail, and in this way grades as steep as one in four were surmounted with apparent ease by a locomotive and two cars.

Recent reports from Switzerland, however, seem to indicate that such steep grades, even with the exercise of the greatest precautions, are not entirely safe. An ascending passenger train was recently stopped by the inability of the locomotive to carry it any further. All the brakes were applied as tightly as possible, but the train began to slip down gradually, and was beyond the control of the engineer and brakesmen, when the timely arrival of a second train with a fresh engine fortunately averted a shocking accident. The slipping train had acquired but little velocity; otherwise it would have been impossible to have held it, even by means of the other locomotive.

Tyndall on Light and Electricity.

HEAT and sound have already been treated by Professor TYNDALL, of the Royal School of Mines at London, in volumes which are among the most fascinating of modern scientific literature. They are evidently little more than reports of the admirable lectures of the author on these subjects. And now we have before us, in a neat volume published by the APPLETONS, the notes of similar lectures upon light and electricity. These notes are to the full lectures, such as are contained in the books on heat and sound, mere skeletons; and hence they lack much of that conversational charm which hangs around Professor TYNDALL's full and free utterances. But they display a good deal of his peculiar aptness in "the art of putting things," and constitute an excellent syllabus for lecturers and teachers, as well as for students, to follow. Indeed, it is for this purpose that they were originally prepared, and not for general publication.

The English edition of LONGMAN & Co., of which this is a reprint, was marred by careless proof-reading. Professor TYNDALL, in the preface to his Notes on Light, thanks his friend Professor GOODEVE for having looked over the proofs. We wish the author had done it himself, instead; and we wish still more that the APPLETONS had made their proof-reader do more than blindly "follow copy," and repeat the blunders of the English original. Here are a few, which we have found in both editions, among the notes on light:

In paragraph 254, the denominator of the fraction representing the wave-length of the violet light is printed 575,000 instead of 57,500.

In paragraph 359, *firstly* is printed for *first;* and in paragraph 363, *should* is interjected, disastrously for grammatical accuracy.

In paragraph 376, a diagram is described and discussed by letters, but no diagram is given; and it would be a difficult matter to construct one from the vague account given.

Besides these absolute errors, we have marked a number of places where Professor TYNDALL might well have been more explicit, and where the American editor might have added brief foot-notes with much advantage to the reader. One instance of obscurity is found in paragraph 358, in which we are told that a slit is placed in front of the electric lamp, and this slit is looked at from a distance through another slit, while the light of the lamp is rendered monochromatic by placing a pure red glass in front of the slit. One has to read through a long discussion of the experiment, and then reason backwards, to discover in this paragraph which slit is *the* slit, and which side of it is in front.

Still more irritating is the statement, in paragraph 325, that "Father SECCHI, of Rome, has studied the light of many hundreds of stars, and divided them into four classes," without any hint of what those classes are.

Some characteristically British omissions in the Notes on Electricity should have been corrected by an American editor. The "historic jottings concerning the electric telegraph" settle our American disputes on that subject in a comically unsatisfactory manner, by putting MORSE at the tail of the list, and omitting altogether the name of JOSEPH HENRY! We do not quarrel with the former particular; but the latter is a piece of stupid injustice. Professor HENRY invented the form of electro-magnet used in the telegraph, in which the wire is insulated from the iron bar by winding with silk. This Professor TYNDALL calls STURGEON's application of ARAGO's discovery; but he should know that STURGEON's electro-magnet was soft-iron, varnished for insulation, and surrounded with naked wire. By the improvement of Professor HENRY, at least a hundred times more magnetism was produced than by the arrangement of STURGEON, from the same battery. But Professor HENRY actually exhibited, in 1832, an apparatus for ringing a bell at a distance by means of a galvanic current producing electro-magnetism.

We must do Professor TYNDALL the justice to say that he is remarkably free from professional or national jealousies. In all his works, he has shown a sincere desire to give honor wherever it is due. Indeed, there are few English scientists (like Mr. CROOKES, for instance) who deliberately attempt to rob their rivals in other nations of all credit for their work. The majority of them sin ignorantly or carelessly, not meanly, in this respect. No doubt, when this country can boast more eminent men and important scientific discoveries, we shall be less jealous of small balances of honor than we are now. But at present we point to few really great American scientific investigators. JOSEPH HENRY is one of them; and we cannot afford to have his laurels stolen, even "by mistake."

Freiberg Smelting Process.

IN another column will be found the first of a series of articles by PERSIFOR FRAZER, Jr., upon metallurgical processes practiced at Freiberg, Saxony.

These articles originally constituted a paper read by the author before the American Philosophical Society, and published in their transactions. They will be found of great practical value in refreshing the memories of those who are already conversant with the subject, and will give much valuable information to western miners and metallurgists seeking new and economical modes of working. The paper was accompanied by a chart or tree, giving a general view of the entire process of working the ores, and showing the relations between ores and their products, and *vice versa*.

Like trees have already been made by LORENZ and others, but they are constructed on a different plan, are much larger, and the synthesis of the products is attended with more difficulty, unless one already knows what one wishes to find, viz.: the intermediate products from which the final product is derived.

OBITUARY.

Charles Callis Western.

IT is with profound regret and sorrow that we announce the death of this amiable, genial gentleman, the founder of this journal, and for many years identified with its management.

He was the third son of the late HENRY M. WESTERN, a well-known lawyer of this city. He was born on the 15th of July, 1842, and died at New Rochelle on the 9th instant.

In 1858, while still quite young, he went to California, where he remained for about three years. His experience there was rough and varied, and at one time he worked in the mines with pick and shovel. His talent for drawing and his facility with the pencil, however, furnished him with a means of subsistence, and drew him naturally into connection with the press, for which he had also a great natural bent. Entirely without assistance, he saved sufficient money to start a comic paper in San Francisco, called the *Momus*. In this undertaking he was not successful, but his failure was doubtless due to the same difficulties which always encompass comic papers in this country. He again resorted to his pencil, and with instruction, mastered the art of wood engraving, which he successfully practiced till 1861, when he returned to New York to receive the share of his father's estate, which fell to him on his attaining his majority. He intended to return again to California, but his health had been impaired by his hard confining work in San Francisco, and he determined to endeavor to recruit it by fresh air and exercise among the mountains.

As a sample of the hardships which he met in California, he frequently alluded to the occasion of his return on foot with one comrade from the mining camps to the coast, a distance of several hundred miles. They were weary and foot-sore, without provisions and scarcely able to stand, far away from civilization, and there seemed no chance of their obtaining any help. His comrade was stouter, more able-bodied than he, and able to proceed further.

When they came to a little stream in the afternoon, he felt that he could not go any further; so he lay down, dipped his feet in the stream, and sent his companion on. He said that he never expected to get up again; and only the timely passage of an ox-cart, whose driver's attention was attracted by his groans, afforded him means of escape.

In the spring of 1866 he founded the AMERICAN JOURNAL OF MINING, and three years later the *Manufacturer and Builder*.

His indomitable energy, perseverance, and pluck carried him through with both of these undertakings. He was always proud of his work, in which he took the greatest interest, and never spared himself any exertion which he thought would add to its merit, even when so run down in health that it seemed almost impossible that he could stick to his post any longer. He knew that nobody else could do *his* work as well as himself, and hence he would not give up as long as anything remained to be done.

His generosity, amiable disposition, and goodness of heart endeared him to all with whom he came in contact; and he was, we believe, one of the few men of whom it can be said, "He never lacked a friend."

A New Method for the Separation of Gold and Silver on a Large Scale.

By Dr. F. GUTZKOW.

THE usual method employed on a large scale, for a considerable number of years, for separating gold from silver, copper and other metals, consists in treating the alloy with concentrated sulphuric acid at a high temperature, and precipitating the silver from its dilute sulphuric acid solution by means of metallic copper, the desilverised liquor being used for the preparation of sulphate of copper. This, however, is in many respects deficient; for, in the first place, there is a large bulk of water required to dissolve the rather difficultly soluble sulphate of silver, and this large bulk of liquid requires, of course, large-sized vessels to hold it. Of far more importance is, secondly, the fact that it involves the production of a large quantity of sulphate of copper, a salt now obtained as a by-product in such large quantities, in various metallurgical and other operations, that, owing to its always yet rather limited consumption, this salt is very difficultly saleable. The manufacturer has, in most instances, to content himself with accepting a price for this article which often only barely covers the expense of the sheet copper employed and the copper present in the alloy which has been operated upon. Taking these matters duly into consideration, the author, who, while residing at San Francisco, in California, was for a series of years the manager of the extensive silver refining works belonging to the San Francisco Assaying and Refining Company, considered it to be of the highest importance to make a radical change in the method of silver refining just alluded to, and to limit the manufacture of blue vitriol to the comparatively small quantity of the copper contained in the crude unrefined ingots. It was found unsuitable to substitute sheet-iron for the sheet-copper in the precipitation owing to the fact that, by the employment of iron, copper is, of course, again precipitated along with the silver; and the separation of the copper from the silver does not admit of any other method readily executed on the large scale than a repition of the same process again. The author found, however, that the reducing agency of sulphate of iron (green vitriol) can be applied successfully to the solution of sulphate of silver. The process about to be here described has been employed for a series of years in the works above-named, and by this process several thousand hundredweights of fine silver have been produced. It should be observed at the outset that it is not readily possible, for reasons which are not here further alluded to, to work on the large scale with sulphate of iron upon the solution of sulphate of silver in water. On the contrary, it is required to prepare, first, crystallised sulphate of silver, free from impurities, inclusive of metallic gold in finely-divided state, sulphate of lead, and other substances, insoluble in a solution of green vitriol. The pure crystallised sulphate of silver is next to be acted upon by a hot and concentrated solution of green vitriol. The very hot, turbid, thickish fluid obtained by the action of boiling concentrated sulphuric acid upon the silver alloy under operation is poured into a large-sized cast-iron cauldron, containing dilute sulphuric acid at 58° Baumé=1·617 sp. gr., and previously heated to 110°; a small quantity of water is next added; and after the liquor (having been left at rest for a few minutes) has become clear, the solution is syphoned over into another similar cauldron, so placed and arranged as to admit of being thoroughly cooled by means of cold water externally applied. For every hundredweight of silver refined, 10 cubic feet of the dilute acid (sp. gr. 1·617) are taken. The addition of water just alluded to is intended to reduce the very concentrated acid silver solution to the same density, and the quantity of water to be added may be therefore inferred from this explanation. The addition of water is intended, however to effect something else yet. Precipitates of sulphate of lead and sulphate of silver are formed, and the latter does not become quite permanent until, first, all the lead which was in solution is precipitated; and, moreover, these heavy precipitates greatly aid the throwing down of all substances which render the liquid turbid, and especially the gold. By the means just described, a clear liquid, quite free from any lead and gold, is far more rapidly and completely obtained than by the method usually applied—viz., the pouring of the very concentrated sulphuric acid silver solution into water.

The liquid, having been cooled in the manner just alluded to, and reduced to a temperature of from 30 deg. to 40 deg., is, by means of a pump, transferred again to the upper cauldron, there to be used again as acid at 38 deg. B. At the bottom of the cauldron in which the cooling took place, the sulphate of silver will be found deposited, forming a hard, yellow-colored, crystalline crust about 2 inches in thickness. This crystalline mass is tolerably free from adhering acid; but at the deepest part of the vessel will always be found some strongly acid mother liquor, and this acid is to be again used to dissolve a fresh quantity of silver. The crystalline mass, consisting of sulphate of silver, is removed from the cauldron by means of iron shovels, and placed on the perforated false bottom of a wooden box lined inside with lead, and placed on wheels, so as to be capable of being moved from one place to another; between the false and real bottom, a tap is placed for running off liquid. Along with the crystals, and adhering thereto, is a red powder, chiefly consisting of sulphate of copper. The next step is to run through, or, more correctly, pour over, the crystalline mass a very hot and very concentrated aqueous solution of protosulphate of iron (green vitriol). The salt of copper is first dissolved, and therefore that liquid is run off separately, afterwards to be used for the preparation of sulphate of copper. As soon as the solution which runs off begins to exhibit the pure brown color due to sulphate of peroxide of iron, the solution is caused to run into a large, very shallow vessel, in which, on cooling, the largest portion of the silver salt is decomposed, and some metallic silver is deposited in a spongy state, which substance is collected and placed on a large filter. The greater portion of the crystalline mass of sulphate of silver which had been placed in the box is, however, converted slowly on into a dense coherent mass of metallic silver, and the reduction may be considered complete as soon as the vitriol solution which runs off has assumed the green color it originally possessed. The metallic silver is next washed with pure hot water, then pressed in a hydraulic press, and lastly melted.

The iron solution which has collected in the large-sized shallow vessel just spoken of, after having become sufficiently cool, is poured or run into a lead-lined tank wherein some scraps of old sheet-iron are placed, and is thus again reconverted into sulphate of protoxide of iron, to be used at a subsequent operation. The small quantity of silver and copper which are separated in the metallic state by this last-mentioned operation is colleted from time to time, and put along with the crystals of sulphate of silver contained in the vessel, wherein they are to be exposed to the action of the sulphate of iron solution. The copper is almost immediately converted into sulphate of copper on coming into contact with sulphate of silver. On the large scale, for every hundredweight of silver reduced from the sulphate 20 cubic feet of green vitriol solution are required.—*Berichte der Deutschen Chemischen Gesellschaft zu Berlin.*

New English Inventions.

IN describing a visit to the exhibition of the Institution of Civil Engineers (English), a writer in the *Mechanics' Magazine* mentions, among others, the following:—One of the leading mechanical attractions was an automatic weighing and classifying machine for coins and counter-blanks. This was exhibited by Mr. J. M. NAPIER, and is one of a number about to be sent to a foreign mint. The apparatus has a hydraulic motor, and stands upon its own base, and independently of the building floor, in order to prevent the inaccuracy arising from vibration, is enclosed within a case having glass sides and a metal top. The coins to be weighed are passed down a trough through an opening of the cover upon the weighing table, and by a most delicately-adjusted balance, the weighing table remains stationary, rises or falls, as the coin is just, light, or heavy; if the former, the feed movement which pushes the coins forward one by one to be weighed advances with a second coin, the first is thrown off, and passes down a hopper into one of three openings leading into its proper drawer below. If the piece is too light, the slight difference of balance shifts the hopper over another opening, and if too heavy over a third, the coin being always pushed off and sent into its proper receptacle. In this way and by this apparatus the coins or blanks are weighed and sorted at the rate of thirty a minute. This speed is the highest practicable, as any increase is found to disturb the perfect accuracy of the machine.

We also noticed a very ingenious balloting apparatus by Messrs. HADDAN & IMRAY, which was manufactured by Messrs. SAXBY & FARMER, of the Canterbury road, Kilburn. In this apparatus the voter enters a chamber, on the wall of which the names of the candidates are written. Under each name there is a handle which projects from the wall. The pulling down of any handle registers a vote for the candidate whose name is over the handle. *The apparatus can be set so as to enable the voter to give one, two, or more votes*, according to the number of candidates to be elected. The voter can only pull one handle at a time, and having pulled down the permitted number cannot pull down more. When the first voter has left the chamber, the official in charge pulls a latch to open the door for the admission of the next. This releases the handles that had been pulled down. Thus, the second voter has no knowledge of the votes given by the previous voter, but finds all the handles ready to be acted upon as he may elect. The votes are recorded by mechanical counters, one to each candidate. These counters are concealed while votes are given, so that the voting is kept absolutely secret. At any desired intervals they can be inspected in order to ascertain the state of the poll.

We can readily see the advantage of such a voting machine for English use. In this country, we have progressed so far that men of but very little intelligence can readily give *one, two, or more votes*, without the aid of any machine whatever.

A newly-discovered quarry of Kansas marble is ten miles from Baxter Springs and covers 15,000 acres. It is in layers of 6, 8, and 18 inches, and 3 to 4 feet thick; pure white and mottled, and inexhaustible. The latter variety is tinged with pink. It takes a fine polish and a fine edge.

MINING SUMMARY.

California.

CALAVERAS COUNTY.

The Calveras *Chronicle* of June 24th says: A week or two since we stated that the quartz mine belonging to Messrs. MATTHEWS, FOSTER & Co., near Whisky Slide, had been conditionally sold, and that the parties contemplating purchasing had a quantity of rock in readiness for crushing. Since then the quartz has been hauled to BANDOLPH'S mill, at Railroad Flat, and worked, yielding $17 per ton. The rock was entirely unassorted, and as it was taken from different places in the shaft, the result of the crushing may be regarded as a fair average of the lead. There is quartz in sight, however, that will pay $150 per ton. Whether the contemplated sale of the mine has been consummated or not, we are unable to state; but the yield of the rock crushed was greatly in excess of what was anticipated. Work has been recently commenced on the old FOOT & THOMPSON quartz lead, near Rich Gulch Flat. Eight men are employed at present, and the force will be increased as soon as practicable. The mine was extensively worked years ago, and a great deal of money taken out; but lately conflicting titles to the lead have prevented its being worked. We understand that the agent of a San Francisco company has effected an arrangement with the various parties who lay claim to the mine, in accordance with which he is to prospect the lead for six months, with the privilege of purchasing at the expiration of that time if he chooses. The Palomo mine, in Lower Rich Gulch, is giving out—$1,000 per week, as usual. When the shaft is sunk two hundred feet deeper, and an additional battery of forty stamps put in motion, we expect to be able to place the weekly shipments at $20,000.

SISKIYOU COUNTY.

The Yreka *Union*, of June 23, says: From the newly-discovered quartz ledge, situated on the side of the mountain west of our town, and owned by the WETHEREL Brothers and LEVI BRADY, about five tons of quartz were crushed last week, in the mill on Humbug. As an average of twenty-two dollars per ton was obtained, the owners will doubtless feel themselves justified in doing more work on the ledge. The five tons crushed were obtained within a few feet of the surface, and a deeper shaft and more extended examination are necessary before anything certain can be known of the value of the discovery. However, the prospect is certainly flattering.

LOS ANGELES COUNTY.

The Los Angeles *Star*, of June 21st, says: From S. A. BUTLER, just arrived from Cerro Gordo, we learn there are about five hundred men in that camp, that the mines are yielding abundantly, that work is plenty, water scarce, and that the Beaudry furnace is to be rebuilt at once; also that a company is being organized in San Francisco to bring water into the camp from the spring across the mountains, a distance of seven miles. Water is all that is needed to make this camp one of the liveliest on the coast. It has built itself up to its present status with money taken from its mines, and has shipped several millions worth of silver bullion to this city.

PLATINUM IN LOS ANGELES.—According to the Los Angeles *Star*, a party of three persons started out in 1860 prospecting in the region of the Bitter Springs. They met with little success, but when on the point of returning, discovered what was supposed to be a silver mine. A load of the rock was shipped to Los Angeles, and was, on being assayed, proved to be platinum, worth more than gold. Many inquired from whence came such riches; none would answer the question; $50,000 was offered for an interest, and refused. Two of the party, after proving their first load of rock, and while *en route* for the location, through some unaccountable means, were taken ill and died. The third dropped the matter, went to St. Louis, died there, but left his secret to a merchant, who has recently started out from los Angeles in search of the mines. He values the discovery at a million of dollars, but platina mines, such as this reports to be, have never been discovered.

YUBA COUNTY.

The cement mills in and around the French Corral, says the Marysville *Appeal*, of June 23d, are spoken of as very successful. From a gentleman, who passed through there a short time since, we learn that they work to a charm, and that the owners are realizing large profits from their investments. There are many bodies of gold-bearing cement in the mines, which are valueless to the miner, for want of such means of pulverizing the earth as shall allow the water to dissolve it. The result sought has been obtained by these mills, and we doubt not but they will be rapidly multiplied, giving employment to many miners who are now out of profitable employment, or idle. The cement on which these mills are working is very hard, and, worked by the old hydraulic process, yielding but little pay, the dirt being washed through the flumes before it is dissolved, carrying the gold with it.

AMADOR COUNTY.

The Amador *Ledger*, of June 24th, says: The Kennedy mine is steadily improving, and at the present time they have a well-defined vein full six feet in width. The company have commenced another "sinking," intending to go down one hundred feet deeper and thus secure a sufficiency of rock to keep their mill running all winter. Work on the Coney mine has been stopped for the present, the owners preferring to let their mine remain idle until the present difficulties in this county come to an end.

The Scientific *Press*, of San Francisco, says the strike goes on in Amador county. Troops are on the ground and the pumps were all started on the 27th. The general feeling of the people of the county is against the strikers; for business of all kinds is at a standstill in consequence of their action. In any case, the members of the "League" will be set aside, and other hands will be employed in the mines. So much for "Leagues" which undertake to coerce outsiders.

MARIPOSA COUNTY.

The *Gazette*, of June 23d, says that DAN JONES, lessee of the Oakes & Reese mine, Hunter's Valley, is taking out some very rich rock, some of which we saw. Most of the rock will average $50 per ton. About thirty men are employed about the mine and mill. The Washington mine and mill, near Hornitos, are in full operation, taking out good rock: The company are sinking a new shaft.

NEVADA COUNTY.

WEBSTER CO.—Grass Valley *Union*, 20th. The Company give notice of their intention to remove their principal place of business from Grass Valley to San Francisco. Also increasing their capital stock to $500,000.

NEW YORK HILL MINE.—Same of 27th: The machinery has been put in order, smoke and steam can be seen at the mine, and the pumps started yesterday morning. The mine has lately changed hands. The water will be pumped out as rapidly as possible, repairs made, and crushing commenced.

KEYSTONE GRAVEL CO.—Same of 24th: This company have purchased four or five claims on Montezuma Hill, which they have consolidated. The gravel prospects well 200 feet above the bed-rock, and as high as $90 to the pan has been obtained from the gravel. The new company propose to open the channel by two bed-rock tunnels, one giving outlet into Shade Creek, and the other into the Yuba.

PENNSYLVANIA MINE.—This mine has just been sold to a San Francisco company for $45,000. A year ago this was one of the "played out" mines. It had "busted" two companies, leaving the last owners in debt $17,000. J. H. HELM then took it. A new level was then opened and a new well defined ledge of 3½ feet struck. The rock has for several months past yielded an average of $40 per ton—and with a four stamp mill the clear profit has been $4,000 per month.

HYDRAULIC MINES.—*Appeal*, 23d: The mines near San Juan are yielding handsome returns. The America has yielded $2,060,000 since it was opened. They are now running a tunnel from the Yuba river to get at the bed-rock of the old channel.

We hear complaints from our gold dust buyers, says the Grass Valley *Union* of June 24th, that the quality has deteriorated so much that it leaves no margin of profit, and, on the contrary, subjects them to loss at the prices before paid. We learn that some of them are determined either to pay less prices or abandon buying altogether. It can not be expected that they will pay more for it than they can realize at the mint. Prices have ranged too high for the past year, and there can be no object in buying at a loss

Colorado.

From the Central City *Register* of July 5th we extract the following items of mining news from Clear Creek county: WM. BEMENT, at the Washington mill, has a complete establishment for dressing ore, assaying, storage, sampling and sacking. He has a large amount of ore on hand, and seems to be doing very good work. PALMER & NICHOLS are working steadily. STEWART'S works are filled with mechanics, setting up the machinery of the Arey furnace. In two weeks we may be able to give the results of the first work with this furnace. On the counter of J. B. CHAFFEE & Co. were displayed yesterday one silver brick, weighing 826 ounces, coin value $907.77, and 850 fine, from Stewart's. Also one from PALMER & NICHOLS' which weighed 1197.10 ounces; coin value, $1,402.28, and 906 fine. Mining matters about Georgetown are in a flourishing condition. Prof. DIBBIN is sure of a supply of ore for a year ahead. There are 60 tons on the dump, and the mine is looking better as depth is reached. The character of the ore has changed recently. Eighteen inches of galena has been found on one side, and twenty-four inches of spar and decomposed sulphurets of silver on the other. This is known as the international lode.

BOULDER COUNTY.

The excitement at Caribou over the discovery of a new belt of silver-bearing veins, rivals that occurring at the time of the original discoveries. The new series is said to be stronger and richer than any previously uncovered FREEMAN, GRAY & Co., on the Black Warrior, are doing what our interests most demand, and what a hundred others ought to do, sending ore to the smelting works. Of a lot forwarded a few days ago, the best brought them $320 per ton, and second-class, $140. This morning, at the shaft of the Caribou Company, we found them raising ore from the splendid sheet of silver-bearing mineral a few days ago uncovered in the east end of the mine. It was a fine sight to see the heavy blocks of sulphurets coming to the surface from the depth of one hundred feet. Some of these chunks were two feet in thickness. Heavy pieces lay on the dump, estimated to contain not less than $1 per pound. In the spacious ore house of the Caribou mine—BREED & CUTTER—we saw a sack containing 225 pounds of fine black and grey sulphurets, at the least worth at the rate of five thousand dollars per ton. This, and many sacks of ore of the value of five hundred dollars per ton, or near that value, more or less. This is from the drift. The water is out of the mine. It will be left to drain a few days when work will be actively resumed in the bottom, where the best pay lies. CHAS. SMALLS & Co. are working the Hidden Treasure, which they recorded about a year ago. They sent a lot to HILL'S last fall, which brought them $188 per ton. They are now rolling out considerable quantities of the high grade for market. The copper-stain in this vein is very strong. It is four or five feet between the walls, all filled with valuable ore, the very rich portion of which is eight inches in thickness. We believe this to be one of the very best lodes on the Caribou hill.

Montana.

IDAHO DISTRICT.

Helena *Gazette*, June 19th: By a miners' meeting at Indian Creek, June 6th, it was resolved that all mining claims must be represented within thirty days, and that those represented might lie over one year.

FREDRICKSON.

The Miners' ditch is carrying 1,500 inches of water. Some two hundred men are in the district working night and day, and all the indications are favorable. In Dry gulch Gillis, LEVERIDGE & Co. are working six men, POTELLO & LEIDEMAN four men, and BISONET, MURPHY & Co., three men.

From the *Independent* of the 16th: Mr. PAT KARR, from Blackfoot, informs us that his company cleaned up from their claim in Illinois gulch, after eight days run, one hundred and eight ounces, or about $2,000.

CABLE.—E. D. AIKEN tells us that matters are looking up. The ditch is carrying two inches of water, and mining will begin in earnest next week. Work is progressing upon the Cameron ledge, with good prospects.

HIGHLAND.—CHARLEY GANTER and CHARLEY MOORE are taking out from $400 to $600 per week on the old Pfifer ground in the main gulch. NEVINS & Co. are taking out first class ore. The Only Chance arastras are running, and the yield will be greater than ever.

GERMAN GULCH.—There is more water in the gulch this year than has ever before been known, and the vast amount of snow now on the mountains is indicative of a bounteous supply during the whole season.

BLACKFOOT.—On Ophir Bar, HEADLEY, KARR & Co. are running a hydraulic and making $20 per day to the hand. Near by in the Illinois gulch, MCCOY, BOYLE & Co. are working some of the best ground in the country. On Upper Ophir gulch, DAN JOHNS, BROWN & MAUPIN, CARR & FRAZIER, PROUT & Co., JAS. BINGLY, and several others, are mining with better results than at any time. For six miles down Ophir, from Blackfoot City, the best of mines are being worked on bars, hills, and in gulch. On Carpenter's Bar there are six hydraulics running day and night. In Snow Shoe, RUFUS JOHNSON is running a hydraulic in the lower part of the gulch, with a bank of gravel ten feet deep, that prospects as high as $1 50 to the pan. On Gold Hill, JOHNSON & Co. have been making

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as high as $50 to the hand. On Upper Snow Shoe, PAT and JAMES KELLY are reported to be making an ounce per day to the hand. At Gold Cañon, still further on, towards the north fork of the Little Blackfoot, two men drifting took out twenty ounces last week.

Nevada.

COPE DISTRICT.

A correspondent of the San Francisco *Bulletin*, writing from the Cope district under date of June 20, says: Much of the ore of this camp is rich enough to pay for crushing dry and roasting, and the only mill in the district which is kept in constant operation is a dry crushing mill with a reverberating furnace. The present charge for reducing by wet process is only $16 per ton, while $30 is demanded for dry crushing and roasting, yet our miners find it to their advantage to pay the difference, especially on ores assaying upwards of $100 per ton. But this district can furnish a large amount of low grade ore, whenever attention is attracted to it and mining is prosecuted with capital, as in the older distrits of this State.

THE ARGENTA COMPANY.—The Argenta Company still continue to work their ores by wet process, and the ores from the Excelsior ledge are reduced by wet crushing. The Argenta is the only company operating in this district on any extensive or systematic plan, and indeed the only one, except the Excelsior, that employs any considerable number of skillful and experienced miners. During the last year these two companies have extracted and had reduced over 2,000 tons of ore, which has worked from $40 to $100 per ton, and even higher, at a cost for reduction at no time exceeding $20 per ton. Hitherto the ores extracted by these two companies have been taken out within one hundred feet of the surface, but the Argenta Company are now preparing to commence stoping from the 400-foot level, and they will soon be able to keep all the mills in camp constantly employed.

INDEPENDENT LEDGE.—The owners of the Independent ledge have recently commenced work in good earnest, and will increase their force as fast as they extend their levels. They have out about 100 tons of fine ore, and recently twenty-five tons, which was reduced by dry crushing and roasting, netted the owners over $300 per ton, after deducting the cost of reduction. The ledge is said to be nearly three feet wide, but it is not yet fairly opened, as it was discovered and located only four months ago.

OTHER MINES.

The El Dorado Company are preparing to resume work on their ledge, which is fully five feet in width, and is opened by a shaft fifty feet deep on the incline of the ledge. In sinking this shaft, about twenty-five tons of ore was extracted, which gives an average pulp assay of $230 per ton, and has worked about $190 per ton. The Emmett Company have a vein varying in width from twelve to eighteen inches. Twenty-six tons from this vein have recently been worked, and yielded $146 per ton. The Pride of the West, Belle of the West, Nevada, Idaho, Monitor, U. S. Grant, and other leads here have, during the past six months, furnished several hundred tons of ore to our mills, all of which have yielded satisfactory returns to their owners, the ore never working less than $25 per ton by wet process, and some of it, when crushed dry and roasted, working over $100 per ton.

PROSPECTS OF THE DISTRICT.

All impartial observers admit that the prospects of this camp are flattering, and all we need is energy, assisted by capital, to make out of this new district a rich and flourishing region, which will soon send out fifty or one hundred thousand of bullion a month, instead of little more than twenty thousand. The exact figures for the last thirty days are $22,437 26.

ELY DISTRICT.

The *Record* of June 22d says: WELLS, FARGO & Co. shipped, on June 14th and 17th, by the way of Salt Lake, bullio n valued at $21,309 91.

CRESCENT DISTRICT.

At a meeting of miners held at Crescent (near Hiko), June 10th, a new district was formed out of a portion of the old Pahranagat District. New life appears to have been infused into mining matters in that vicinity. Crescent mill, long idle, has started up again, with a prospect of running steadily. The mill is at present running on custom rock of high grade from Templute and Crescent.

EUREKA DISTRICT—PHOENIX COMPANY.

The *Sentinel* of June 20th says: For some days past the company has been getting out $370-bullion. Last week a purchase was made of the Jenny Lynch mine for the purpose of getting the necessary lead to run the richer ores. Yesterday, at San Francisco, Judge LAKE sold the Otho mine, that he purchased of MCGEE, STOUT & THOMPSON, to the Phoenix Company, and at the same time the Superintendent leased the Jackson furnaces, and is already having ore and coal delivered. To-night they will commence smelting.

BULLION SHIPPED.

From the 1st of May to the 15th of June there were shipped to Palisade, by the fast freight line, 462,000 lbs. of bullion. The other lines have been shipping at the same time. During the time the furnaces have been accumulating bullion and have a large quantity now on han

The same paper of the 21st says: The explorations in the Richmond have been continued, and now, at a depth of 74 feet in an incline, and at the end of a drift 118 feet long, the ore is in larger quantity than in any mine in the district. Up to this time neither top, bottom nor sides have been discovered, but it seems an immense deposit of the richest ore.

Utah.

Salt Lake *Herald*, June 16th: BUEL & BATEMAN shipped to the Omaha works on Wednesday, forty-one tons of bullion, and yesterday ten tons more. They expect to ship a car-load of ten tons a day regularly, with an extra car load every third day. This will make eighty tons a week.

DEPARTMENT OF PUBLIC WORKS, NO. 237 BROADWAY.—CHANGE OF GRADE.

Public notice is hereby given that propositions for the following improvements are pending before the Board of Aldermen and Assistant Alderman, viz.:

To change the grade of Fifty-fifth street, from the Eleventh avenue to the New Boulevard line on the North River.

Maps showing the proposed change of grade can be seen at this Department, Room 14.

All persons interested in the foregoing mentioned change of grade, and having objections thereto, are requested to present the same, in writing, to the undersigned, at this Department, on or before the 13th day of July proximo.

Dated, New York, June 30, 1871. WILLIAM M. TWEED,
Commissioner of Public Works.

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Albany, July:5.1871 Secretary & Treasurer.

U. S. PATENT OFFICE,
WASHINGTON, D. C., May, 25, 1871.
On the petition of CHARLES H. SAYRE of Utica, New York, praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Cultivators.
It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension.
M. D. LEGGETT, Commissioner.

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.
On the petition of JOHN TOULMIN of Worcester, Mass., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvementin Vibrating Shears.
It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing aguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT,
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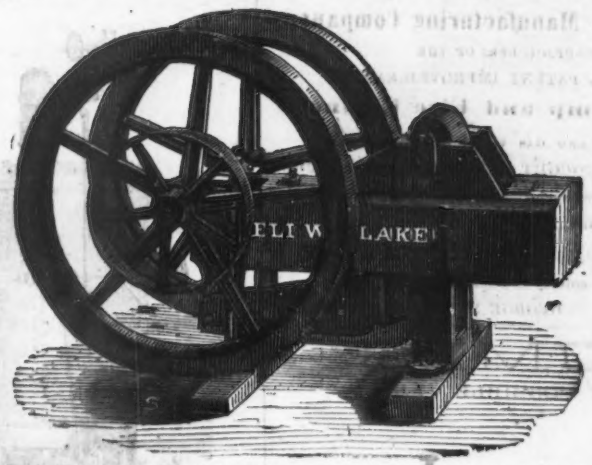

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☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

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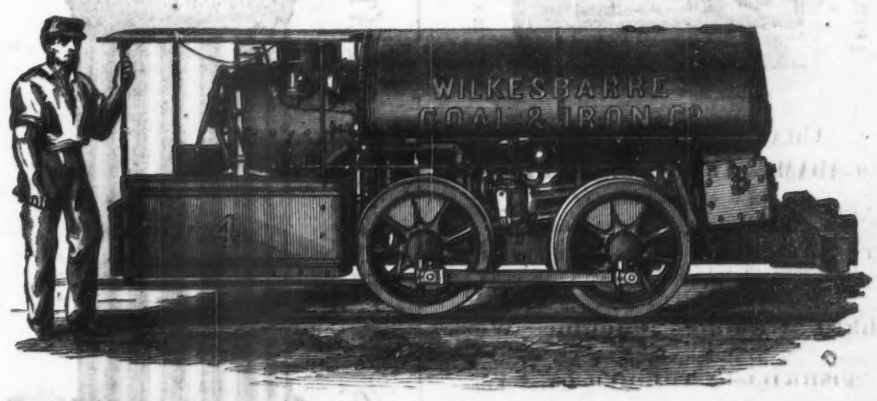

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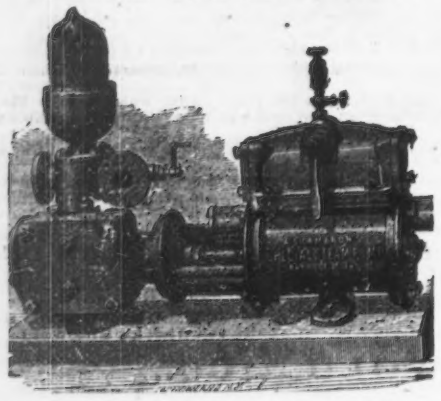

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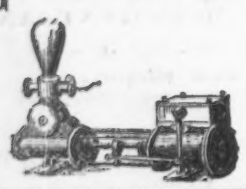

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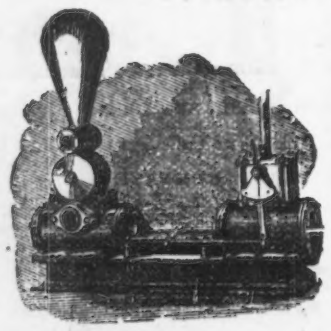

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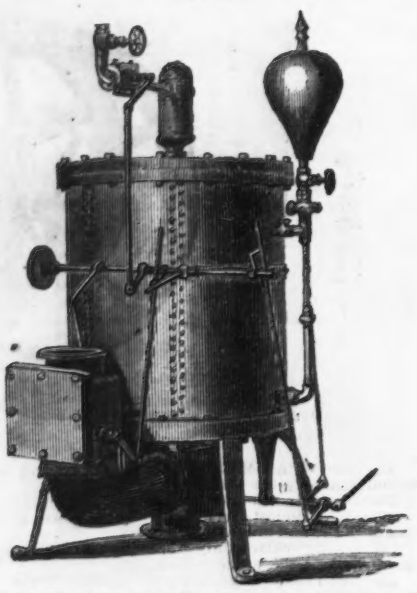

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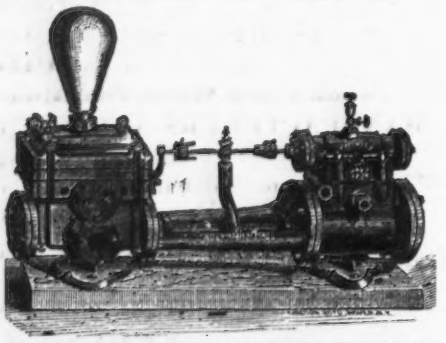

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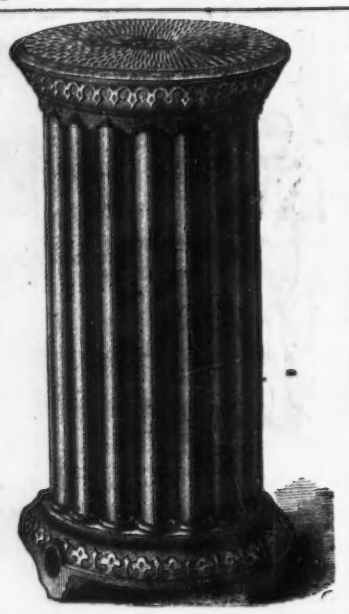

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May 26, 1871.
On the petition of THOMAS J. CHUBB of New York N. Y., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Separating Ore.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.
On the petition of JOSEPH W. BUDD, of Midland City, Michigan, Administrator of ISRAEL DODENHOFF, deceased, praying for the extension of a patent granted to the said ISRAEL DODENHOFF, on the 18th day of August, 1857, for an improvement in Raking Apparatus for Harvesters.

It is ordered that the testimony in the case be closed on the 18th day of July next, that the time for filing arguments and the Examiner's report be limited to the 28th day of July next, and that said petition be heard on the 2d day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

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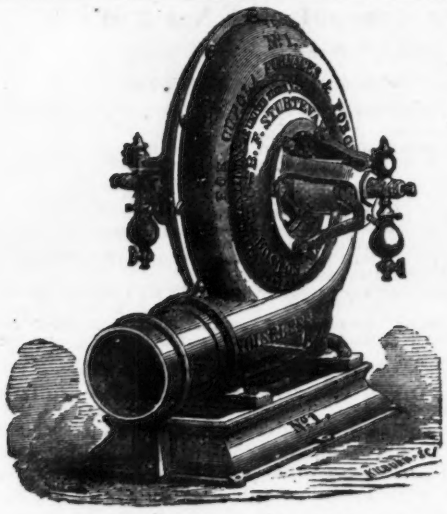

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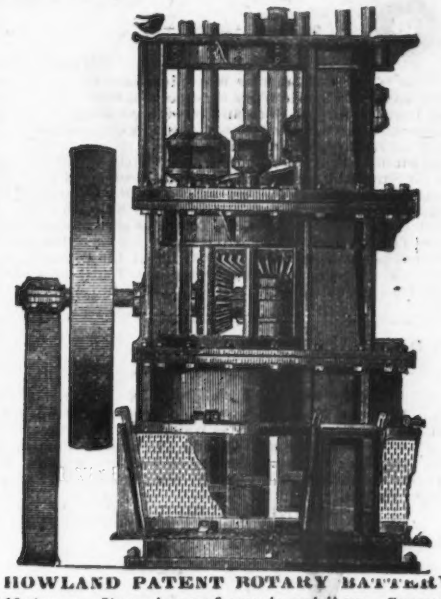

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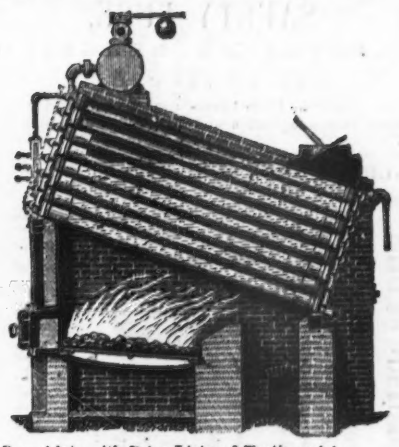

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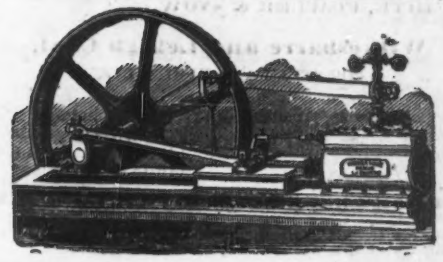

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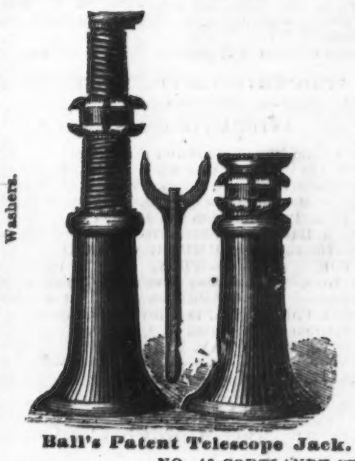

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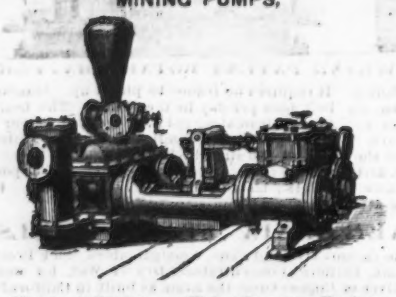

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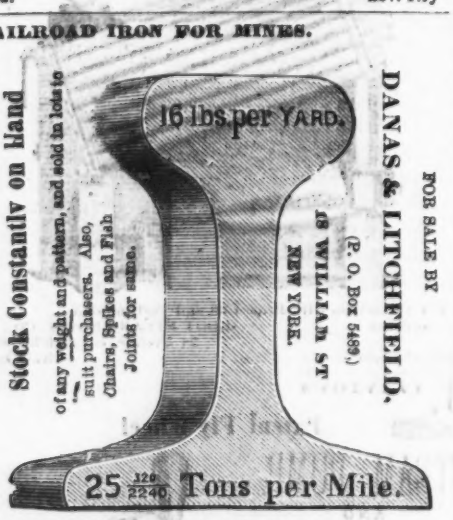
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